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Wage-Stickiness, Monetary Changes, and Real Incomes in Late-Medieval England and the Low Countries, 1300 - 1450: Did Money Really Matter?

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Wage-Stickiness, Monetary Changes, and Real Incomes in Late-Medieval England and the Low Countries, 1300 - 1450: Did Money Really Matter?

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Abstract:

Bedevilling the ongoing debate about changes in real-incomes in late-medieval western Europe, especially during the so-called 'Golden Age of the Labourer', is the very troubling issue of 'wage-stickiness'. The standard and long-traditional explanation for this supposed 'Golden Age' of rising real wages is that sharp fall in population – with the Black Death (from 1348), subsequent waves of bubonic plagues, and other forces for demographic contraction up to the late 15th century – dramatically altered the land:labour ratio in ways that led to a pronounced rise in the marginal productivity of labour, which in turn forced up real wages. This simplistic model assumes (1) that rising real wages in the agrarian sector were transmitted to other sectors (whether or not they also experienced rising labour productivity); (2) that changes in the marginal revenue product of labour did not diverge or vary from changes in its marginal productivity; and (3) that wages were flexible, downwards as well as upwards. Though one might readily provide evidence that the MRP of various kinds of labour, in England and the cross-Channel Low Countries (Flanders), did not in fact continually rise as this model predicts, the focus of this paper is instead upon the behaviour of money wages, with widespread nominal 'wage-stickiness', in relation to changes in the price-index and cost of living, in both of these countries. For England, the cost-of-living index is measured by the well known Phelps Brown & Hopkins 'basket of consumables' index; and for Flanders, it is measured by one that I have constructed from Flemish price data, using the same weights as in the PBH index.

For both countries, the evidence indicates that, while money wages for most craftsmen and labourers did rise following the Black Death – though by no means for all labourers -- such a rise did not in all cases keep pace with the inflationary rise in prices that both countries endured for almost 30 years after the Black Death. In England, furthermore, where most craftsmen and workers had suffered a fall in money wages in the two decades before Black Death, the post-Plague rise in money wages did not regain the level of the 1320s until the 1360s. In the later 14th century, however, first England and then Flanders experienced an equally dramatic deflation, one that endured into the first quarter of the 15th century. It was during this deflationary era that real wages finally did rise substantially – and chiefly because nominal money wages remained fixed, while the cost of living fell sharply. The rest of this paper analyses the various institutional, social, and other factors that help to explain the widespread prevalence of money-wage stickiness over very long periods, in England and the Low Countries. For England, the most significant institutional factor to be considered is the role of the 1351 Statute of Labourers, which tried to fix wages at the unusually low level that had pertained on the eve of the Black Death. No comparable wage legislation was imposed in Flanders; and yet the behaviour of real wages there did not significantly differ from those in England.

It must also be noted that, in the early to mid 15th century, some money wages did slowly rise, while deflation continued – thus indicating other forces at work to increase real wages; but in Flanders the resumption of short-term inflations, from the 1420s to early 1440s, with coinage debasements, tended to eliminate these gains, especially for woollen textile workers, those employed in Flanders' major manufacturing industry.

The question posed in the title, 'did money matter', is a very important one; for the almost equally important focus of this paper is that the late-medieval inflations and deflations (including the pronounced deflation preceding the Black Death) were essentially monetary, and not demographic, phenomena.

JEL Classifications: F4, J1, J3, J4, J5, N1, N3, N4, N6

Wage Stickiness, Monetary Changes, and Real Incomes in Late-Medieval England and the Low Countries, c.1300 - c.1470: Did Money Really Matter?

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Nominal wage stickiness and the real-wage problem: J.M. Keynes, Adam Smith, and the evidence

Bedevilling the ongoing debate about changes in real-incomes in late-medieval western Europe, especially during the so-called 'Golden Age of the Labourer', is the very troubling issue of 'wage stickiness'. As used here, the term 'wage stickiness' means the long-term inflexibility, especially downward inflexibility, of *nominal* money wages – and thus emphatically *not* 'stickiness' in *real* wages, which indeed is a virtual impossibility. The *real wage* is the real or physical quantity of goods and services that the artisan, craftsman or other employee can purchase with his money wage – the sum that his employer pays for the piece-work accomplished or the time expended (daily, weekly, monthly) for his labour – *plus* all the material 'fringe' benefits that this employee receives in kind as a further payment for his labour: in terms of food, clothing, shelter, and other material rewards. Many, perhaps most, economists focus much more on the behaviour of real wages rather than on money wages in analysing labour markets and the impact of labour changes upon the economy; and that was even more true of the Classical Economists in the nineteenth and early twentieth centuries.

Those who neglect the significance of money wages and the historical problem of nominal wage stickiness have ignored not only John Maynard Keynes but also Adam Smith. The former commented that: 'the Classical Theory has been accustomed to rest the supposedly self-adjusting character of the economic system on an assumed fluidity of money-wages; and when there is rigidity, to lay on this rigidity the blame of maladjustment'.[1] Drawing upon historical evidence, Smith, as the founder of the Classical School, did in fact offer supporting evidence for the view that money wages were not so fluid, cogently observing in the *Wealth of Nations* that:

> The wages of labour do not in Great Britain fluctuate with the price of provisions, [which] vary everywhere from year to year, frequently from month to month. But in many places

[1] John Maynard Keynes, *The General Theory of Employment, Interest and Money* (London, 1936), p. 257.

> the price of labour remains uniformly the same sometimes for half a century.... The high price of provisions during these ten years past has not in many parts of the kingdom been accompanied with any sensible rise in the money price of labour.[2]

He was not far off the mark. For, in southern England, the money wage of master masons and carpenters had remained fixed at 24d per day (i.e. 2s 0d) for precisely 40 years, while the well-known Phelps Brown & Hopkins 'Basket of Consumables' composite price index had risen, over the same 40-year period (1733-73), by 57.4 percent.[3] By far the longest recorded period of nominal wage stickiness recorded in English price-history is to be found in the payment records for late-medieval masons and carpenters at Oxford's colleges. From 1363 to 1536, a period of 174 years, they were paid an unvarying wage (certainly for the Easter-Michaelmas season) of 6d per day, or 3s 0d per six-day week. When they then received their first modest increase, to 6½ d in 1536-37, they had already suffered some considerable ravages of inflation, a more than 50 percent rise in the price level, from the well-known Price Revolution, which had commenced around 1516-20.[4]

If the continental evidence fails to provide evidence quite so impressive, nevertheless long-term nominal wage stickiness was clearly also the prevalent feature of labour markets in the Low Countries for the fifteenth and early sixteenth centuries. Thus, in Bruges, the daily money-wage for a civic policemen

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[2] Adam Smith, *An Inquiry Into the Nature and Causes of the Wealth of Nations* (1776), ed. with introduction and notes by Edwin Cannan (New York: Modern Library, 1937), p. 74.

[3] E.H. Phelps Brown and Sheila V. Hopkins, 'Seven Centuries of Building Wages,' *Economica*, 22 (August 1955), and E.H. Phelps Brown and S.V. Hopkins, 'Seven Centuries of the Prices of Consumables, Compared with Builders' Wage Rates', *Economica*, 23 (November 1956): both reprinted in E.M. Carus-Wilson, ed., *Essays in Economic History*, 3 vols. (London, 1954-62), Vol. II, pp. 168-78, 179-96, and in E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), p. 178: indicating 22d-24d per day from 1730-36, and 24d from 1736-73; and 24d rising to 29d per day from 1773 to 1776. I have also revised the values of the sub-indices and of the composite price index from tabulating the data from their working sheets, in: Archives of the British Library of Political and Economic Science, the Phelps Brown Papers Collection.

[4] See Phelps Brown and Hopkins (n. 3); and James E. Thorold Rogers, *A History of Agriculture and Prices in England*, Vol. II: *1259-1400* (Oxford, 1867), p. 317; Vol. III: *1401-1582* (Oxford, 1881), p. 628. With a base of 1451-75 = 100, the PB&H 'basket of consumables' CPI stood at 96.90 in 1510, and about 110.0 in 1515-17; but by 1536 this CPI had risen to 164.25. The summer daily wage for master masons and carpenters rose to 7d in 1542, and thereafter by 1/2d increments to 10d in 1559, remaining at that rate until 1574.

was fixed at 5d *groot* Flemish (summer and winter) from 1398 to 1476, nominally and initially at half the rate for a master mason, though on an annual payment basis about 90 percent as much.[5] At Mechelen, the predominant daily summer wage for master masons and carpenters in the town's employ was an inflexible 12d *groot* Brabant (= 8d *groot* Flemish) from the Burgundian monetary reform of 1434 to 1490, despite the often enormous fluctuations of the Van der Wee composite price-index between those years: from 99.5 in 1434, a mean of 100.0 in 1451-75, to peak of 200.7 in 1488. From 1490 to 1540 they were fixed at a constant 13½ d *groot* (9d *groot* Flemish). In Antwerp that daily summer wage of 12d *groot* Brabant had prevailed for these craftsmen from 1442 to 1513, except for the ultra-inflationary years of Archduke Maximilian's debasements in 1487-89, when it was temporarily increased, but to just 13½ d per day.[6]

Consider the implications of these data on wage stickiness and prices. For, if we calculate the real wage as the quotient of the nominal wage index and the consumer price index (RW = NWI/CPI), then obviously changes in the price level – the extent of inflation or deflation – will fundamentally determine the changes in real wages. Adam Smith himself commented that , if 'the labouring poor can maintain their families in dear years, they must be at their ease in times of moderate plenty, and in affluence in those of

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[5] The policemen were paid this daily rate for the full 365 (or 366) days in the year, while the average master mason or carpenter worked at most about 210 days a year. Data from Stadsarchief Brugge, Stadsrekeningen 1331-32 to 1475-76; and Algemeen Rijksarchief, Rekenkamer, doc. nos. 32,461 - 32,566 (1406-1513). For Bruges's craftsmen, see Jean-Pierre Sosson, *Les travaux de la ville de Bruges, XIVe - XVe siècles: les matériaux, les hommes*, Collection Histoire Pro Civitate no. 48 (Brussels, 1977); but the wage-data given here, in this paper, have been taken from the town accounts; and I have not compared them with those given by Sosson.

[6] Charles Verlinden, E. Scholliers, et al, eds., *Dokumenten voor de geschiedenis van prijzen en lonen in Vlaanderen en Brabant/Documents pour l'histoire des prix et des salaires en Flandre et en Brabant*, 4 vols. (Bruges, 1959 - 65), Vols. I and II; Herman Van der Wee, *The Growth of the Antwerp Market and the European Economy, 14th - 16th Centuries*, 3 vols. (The Hague, 1963), Vol. I: *Statistics*, pp. 333-89 (Synoptic Tables of Wages and Appendices 27-30); Herman Van der Wee, 'Prijzen en lonen als ontwikkelingsvariabelen: Een vergelijkend onderzoek tussen Engeland en de Zuidelijke Nederlanden, 1400-1700,' in *Album aangeboden aan Charles Verlinden ter gelegenheid van zijn dertig jaar professoraat* (Gent, 1975), pp. 413-47; reissued in English translation (without the tables) as 'Prices and Wages as Development Variables: A Comparison Between England and the Southern Netherlands, 1400-1700,' *Acta Historiae Neerlandicae*, 10 (1978), 58-78.

extra-ordinary cheapness'.[7] The most famous example of affluence was the post-Plague, later-medieval England (and indeed parts of western Europe). As Thorold Rogers stated so long ago, and as so many others have continually reiterated since: 'the fifteenth century and the first quarter of the sixteenth were the Golden Age of the English labourer, if we are to interpret the wages which he earned by the cost of the necessities of life.'[8] The accompanying tables 2, 4, and 8 clearly indicate that this long period was also one of prolonged deflation, with only a few, sporadic spikes of high prices, especially in England, but also in the Low Countries. Revised data for the Phelps Brown & Hopkins ' basket of consumables' index and building craftsmen's wages, also indicate that the medieval peak in real wages, achieved in 1477, was not again achieved for over four centuries – not until 1886.[9]

Although southern England's subsequent experience with real wages, into the early-modern era, was not replicated, for example, in the cross-Channel Low Countries,[10] surely this historic pattern of real-wages is a most remarkable experience, and one that poses serious theoretical problems for both economists and historians. As Keynes has reminded us, one of the most basic postulates of Classical Economics is that 'the wage is equal to the marginal product of labour'; and of course by that statement he meant the *real* wage.[11] Are we really to believe that in early-modern England, even during a period of relative labour scarcity and

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[7] Smith, *Wealth of Nations* (n. 2), p. 74.

[8] James E. Thorold Rogers, *Six Centuries of Work and Wages: the History of English Labour* (London, 1903), p. 326; Gustav F. Steffen, *Studien zur Geschichte der englischen Lohnarbeiter mit besonderer Berücksichtigung der Veränderungen ihrer Lebenshaltungen*, 3 vols. (Stuttgart, 1901-05).

[9] See sources in n. 3 above. The RWI = NWI/CPI: a measure that can be verified by computing the number of baskets of consumable that a master mason could purchase with his annual money-wage income. In 1477, the RWI was 123.76 (1451-75=100). By 1536, when Oxford masons received their first pay increase, the RWI was only 65.96; and the early-modern nadir was reached in 1631, when the RWI = 31.81. In 1886, the first time that the RWI exceeded that for 1477, the index was 128.88.

[10] See Herman Van der Wee, 'Prijzen en lonen' (n. 6), pp. 413-47. His data show that Antwerp craftsmen did not suffer the same deterioration in real wages as did English craftsmen during the Price Revolution era (1520 - 1640), with substantial demographic growth and inflation in both countries.

[11] Keynes, *General Theory* (n. 1), p. 5: 'The wage is equal to the marginal product of labour'; and more generally, pp. 4-22, 257-79. As argued below, however, W_L = MRP of labour (p. 8).

of significant economic advancement, from the early eighteenth century and throughout the Industrial Revolution era, the marginal productivity of the craftsman's labour still remained below that of the mid-fifteenth century, and would remain so until as late as 1886?

There are of course several intractable measurement problems with these indices. The prices in the Phelps Brown & Hopkins 'basket', and in the other two 'baskets' used here, for Flanders and Brabant, are those paid by institutions, often wholesale for bulk lots, and not retail prices paid by the typical artisan consumer; and they include those for many primary rather than finished products (i.e. raw grains rather than bread), which tended to fluctuate more widely. Furthermore, even though Phelps Brown and Hopkins did periodically change the composition of their basket (about every 250 years, n. 3), the otherwise fixed nature of the index for quite long periods does not reflect the ability of most consumers to make substitutions with changing relative prices. No alternative price indices, however, are likely to change the basic picture and resolve these problems.[12]

Plague, prices and real-wages according to the demographic school: the Postan-Abel model

Avoiding these intractable problems, most medieval historians have instead found a far simpler and more compelling explanation for the remarkably high real wages of later-medieval western Europe: the impact of demographic catastrophes upon agrarian productivity: By far the best known rendition of this view is to be found in the Ricardian-Malthusian models of Wilhelm Abel and Michael Postan.[13] Even the few

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[12] In this study, the real wage has also been computed, for the Low Countries, by calculating the number of 'Baskets of Consumables' that a master craftsmen could purchase with his annual money-wage income (based on a mean of 210 days' employment). Other methods, such as estimating wages values in equivalent grams of pure silver or in litres of grain (wheat or rye), have not been used (as in the following recent study). See Jan. L. Van Zanden, 'Wages and the Standard of Living in Europe, 1500 - 1800', *European Review of Economic History*, 3:2 (August 1999), 175-97: '...that there was no clear cut relationship between economic development and real wage growth' (p. 192); and that his research on real-wages 'throws doubt on some of the conclusions of the optimists', referring in particular to Jan De Vries, 'The Industrial Revolution and the Industrious Revolution,' *Journal of Economic History*, 54:2 (June 1994), 249-70.

[13] See in particular Wilhelm Abel, *Agrarkrisen und Agrarkonjunktur*, 3rd edn. (Berlin, 1978; 1st edn. 1966): translated by Olive Ordish as *Agricultural Fluctuations in Europe from the Thirteenth to the Twentieth Centuries* (London, 1980), chapters 1-3; Michael Postan, 'The Economic Foundations of Medieval Society,' *Jahrbücher für Nationalökonomie*, 161 (1951); and Michael Postan, 'Some Economic Evidence of Declining Population in the Later Middle Ages,' *Economic History Review*, 2nd ser. 2 (1950),

opponents of their model must now accept as an established fact the very drastic nature of the late-medieval depopulations, especially in England, whose population fell from a peak of at least 4.5 to 5.0 million in the 1290s (if not 7.2 million) to about 2.5 or perhaps 3.0 million in 1377, finally reaching a nadir of about 2.25 million in the early 1520s.[14] Familiar though the Postan-Abel model may be, its key elements must be briefly reiterated, if only to clarify the arguments that follow. In essence: (1) the fourteenth-century depopulations, especially those following the Black Death of 1348-49 and subsequent outbreaks of bubonic plagues, and accelerated by a consequent fall in fertility (live-births), drastically altered the land-labour ratio, thus supposedly increasing the marginal productivity of agrarian labour; (2) in a fundamentally agrarian economy, such changes took place all the more rapidly as so many high-cost marginal lands, previously subject to diminishing returns with population growth, were soon deserted, thus allowing arable husbandry to be concentrated more and more on much better quality, higher-yielding lands that produced so much more grain and livestock products with proportionately much less labour;[15] (3) agricultural labour in particular may

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130-67; both reprinted in his *Essays on Medieval Agriculture and General Problems of the Medieval Economy* (Cambridge, 1973), pp. 3 - 27; and 186 - 213 (the latter, with the revised title of 'Some Agrarian Evidence of Declining Population in the Later Middle Ages'); Michael Postan, 'The Trade of Medieval Europe: the North', in M.M. Postan and E.E. Rich, eds., *Cambridge Economic History of Europe*, Vol. II: *Trade and Industry in the Middle Ages* (Cambridge, 1952), pp. 119-256; Michael Postan, 'Medieval Agrarian Society: England,' in M. M. Postan, ed., *Cambridge Economic History*, Vol. I: *The Agrarian Life of the Middle Ages*, (2nd rev. edn. 1966), 560-70; Michael Postan, *The Medieval Economy and Society: An Economic History of Britain, 1100-1500* (1972), chapter 3, pp. 27-40; John Hatcher, *Plague, Population, and the English Economy, 1348-1530* (London, 1977), pp. 11-73.

[14] See Hatcher, *Plague, Population, and the English Economy* (n. 13), pp. 11-73; John Hatcher, 'Mortality in the Fifteenth Century: Some New Evidence,' *Economic History Review*, 2nd ser. 39 (Feb. 1986), 19-38; Ian Blanchard, 'Population Change, Enclosure, and the Early Tudor Economy,' *Economic History Review*, 2nd ser. 23 (1970), 427-45; Bruce Campbell, 'The Population of Early Tudor England: A Re-evaluation of the 1522 Muster Returns and the 1524 and 1525 Lay Subsidies,' *Journal of Historical Geography*, 7 (1981), 145-54. For an estimate of 4.5 million in the 1290s, see Pamela Nightingale, 'The Growth of London in the Medieval English Economy,' in Richard Britnell and John Hatcher, eds., *Progress and Problems in Medieval England* (Cambridge and New York, 1996), 89-106; for the estimate of 7.2 million in 1292, see H. E. Hallam, 'Population Movements in England, 1086-1350', in H.E. Hallam, ed., *Agrarian History of England and Wales*, II: *1042-1350* (Cambridge, 1988), p.536; for an estimate of 2.5 - 3.0 million in 1377, see Edward Miller, 'Introduction: Land and People,' in Edward Miller, ed., *Agrarian History of England and Wales*, III: *1348-1500* (Cambridge, 1991), p. 6.

[15] As indicated by the standard textbook graph on land:labour ratios, if population growth had earlier produced diminishing returns, i.e. a falling MP of labour, depopulation should clearly have had the opposite

have become even more scarce, as former itinerant labourers took up deserted tenancies or sought better employment in the towns; (4) this agrarian re-organisation served to increase real-incomes even more by reducing the *relative* cost of bread-grains and other basic foodstuffs and housing (with much more freely available land); (5) the labourer and artisan, enjoying such rising real incomes, with a greater share of disposable income left after meeting the basic necessities of life, would thus have chosen to spend it on more meat, dairy products, industrial goods, and semi-luxuries, thus driving up their *relative* prices, with such demand shifts; (6) for many manufactured goods, for which labour accounted for a greater share of production costs than was true for most grain products, rising industrial wages would also have served to drive up their *relative* prices. Such is the classic model, which indeed seems most reasonable, and certainly plausible.

This emphasis upon the behaviour of *relative* prices – i.e. a change in the price of wheat relative to a change in the price of, say, linen cloth – is crucial for any consideration of the Postan model and of the analytical discussion that follows. In Postan's so strongly pronounced views, demographic and not monetary changes were chiefly responsible for late-medieval price movements, whose major fluctuations were to be found almost solely or chiefly in grain products.[16] If only grain prices were affected, diverging from other prices, then, in Postan's view, ' monetary factors could not have been the sole or the main cause of the price changes, for the pure logic of the monetary explanation demands that the effects of changes in the circulating medium should be felt throughout the economy, i.e. in the prices of all the goods bought and sold, since

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effect, so long as state of relative underpopulation was not realized.

[16] Thus, Postan stated that: 'A fall in population would also have, so to speak, a selective effect on prices, in that it would tend to lower the prices of agricultural products, which were previously being produced at high and every rising cost .. under steeply diminishing returns.. but would have little effect on commodities not greatly subject to diminishing returns, i.e. most industrial products.' Postan, 'Trade of Medieval Europe' (n. 13), p. 214. And also: Butter happened to be a semi-luxury entering into popular consumption. It is not necessary to know what [Alfred] Marshall said about the elasticity of the demand for bread to in order to conclude that agricultural labourers were now better able to indulge in a little butter, however expensive... It is therefore highly significant that the price of butter and the price of grain diverged more widely than the prices of any other commodities [during] the fourteenth and fifteenth centuries. [And furthermore] the prices for animal products in current coinage actually rose [continuing from 1351] the rising trend of the previous two centuries for another 125 years. *Ibid.*, pp. 208-09.

changes in money must be, so to speak, "neutral" as between different commodities'. [17]

Such views about the behaviour of late-medieval price-movement are, however, are quite fallacious. First, as the accompanying tables 2, 4, and 8 on English, Flemish, and Brabantine prices indicate, the component price-indices for grains, livestock-products, and industrial goods generally all tended to rise or fall together, in distinct phases of inflation and deflation, though with varying amplitudes and differing short-term oscillations. Second, no respectable monetary economist would ever contend that, while monetary forces were at work in the economy, demographic and other *real* forces would remain suspended or frozen, in time, i.e. without having their usual impact, interacting together, in altering the *relative* prices of many individual commodities. Third, monetary expansions or contractions, in terms of changes in *both* the stocks and flows of money, including the supply of credit, achieve their impact by the ways in which those money flows are distributed amongst the various economic sectors and individual economic agents. Thus that impact becomes a function of those agents's individual income-elasticities of demand, and also of the all the various demand and supply elasticities for those goods and services upon which those persons and agents expend their additionally acquired funds, expenditures that again would affect the behaviour of *relative* prices, as well as the overall price level.[18]

Postan, to his credit, did understand the distinction between the behaviour of *relative* prices and shifts in the overall price-level. But he did not observe the now readily available evidence for oscillating price-movements of general inflation and deflation in late-medieval Europe. Many of his disciples,

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[17] Postan, *Medieval Economy* (n. 13), p. 239. See also Postan, 'Trade of Medieval Europe' (n. 13), p. 213: 'And price changes which are not 'general' but are mainly confined to grain point to a factor which has already been shown to have operated in the opposite direction in the early centuries of the Middle Ages, i.e. population'; and 'Economic Foundations (n. 13)', p. 9: '..the movements of agricultural and industrial prices did not synchronize'.

[18] Anna Jacobson Schwartz, in a review of Spooner's *International Economy and Monetary Movements in France* (n. 112 below), *Journal of European Economic History*, 3: 1 (Spring 1974), 253, comments that: 'the author subscribes to a familiar fallacy, namely that a monetary explanation to be valid requires that all prices move in unison'. Her verdict would be equally valid if directed against Postan's injudicious criticisms of the following article: W.C. Robinson, 'Money, Population, and Economic Change in Late Medieval Europe', *Economic History Review*, 2nd ser. 12 (1959), 63-76; and Postan, 'Note', pp. 77-82.

however, subsequently did become quite aware of these longer term price-movements, yet still incorrectly attributed those price movements to demographic changes. They did so by confusing micro-economics with macro-economics: by assuming that a perfectly valid explanation for grain price-changes can be applied to the entire economy and its overall price-level.[19] A growth in population that encounters diminishing returns in agriculture will likely cause *relative* grain prices to rise; but, acting alone, population growth cannot cause all or even most prices to rise. Indeed, with normal budget constraints, one may expect that a sharp rise in grain prices would force consumers to reduce expenditures and thus demand for other, less necessary commodities, driving down their relative prices.

In short, demographic forces can influence long-term price movements *only* by their interaction with other *real* economic forces, and by their ancillary consequences in inducing changes in both money stocks and money flows, including changes in credit. They may also have done so through their impact in inducing changes in real net national output and national income. Monetary expansion can, in so many ways, induce or promote economic growth. As is often the case, in such circumstances, demographic growth, urbanization, and economic development ultimately reduced or even eliminated elements of 'slack' (elastic supplies) in the economy, so that it failed to achieve the same proportional rate of growth as did the still ongoing expansion in money stocks and/or flows. Consequently, as Keynes himself observed, most prices were bound

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[19] As noted above, population growth, acting to increase pressures on relatively fixed stocks of land and capital, will induce diminishing returns, producing rising marginal costs and thus rising grain prices. But the same analogy does not hold for macro-economics. Suppose that we employ a common Keynesian model, with aggregate demand and supply curves (ignoring for the moment the question of what these curves actually represent), as the latter curve, in effect serving as a long-term Supply curve, becomes ever more steeply sloped, when intersected by the upward-shifting aggregate demand curves, i.e. rising from $Time_1$ to $Time_2$. Then, drawing horizontal and vertical lines from the intersections of $D_1.S_1$ and $D_2.S_2$, we apply numbers to the points of intersection on the Y and X axes, as P and Q respectively. Multiplying the results, to indicate the total value of NNP or NNI at each of the time periods, we find that: $P_1.Q_1$ has a value £17.220 million sterling, while $P_2.Q_2$, for the subsequent time period, has a much larger value of £122.960 million sterling. The obvious question now becomes: from where did the economy obtain all that extra money, in order to transact those expenditures that collectively make up Net National Income? From either an increase in the money stock, or from an increase in the money flow (i.e. an increase in Velocity), or from an increase in the two together, which may have been the situation during the Price Revolution era? Consider also that these prices are all expressed in terms of a silver-based money of account, in which the pound [£] always represents 240 currently circulating silver pence; and that the prices, and changes in price levels, were very different when expressed in gold florins.

to rise under these circumstances.[20]

For the wage question itself, there remains one further problem with the Postan-Abel model, and indeed with the usual presentation of Classical Theory. For, in a frictionless market economy, without long-term wage contracts or other institutional impediments, the real wage for any particular occupation or task, defined by time and place, should be determined not just by the marginal product but by the *marginal revenue product* of labour: i.e. the extra revenue that the employer derives by selling the last unit of output produced by the last unit of labour added to his fixed stock of land and capital. If, according to the Postan model, the marginal productivity of agricultural labour rose, with the agrarian and price shifts so posited for the late-medieval English economy, then presumably the marginal revenue from the sale of grain and other arable products so produced on the now chiefly more productive lands should have fallen, with falling prices, thus producing a possible 'wash' in real wage changes. If, however, contrary to the Postan model, *relative* grain prices did not consistently fall, then real agricultural wages may well have risen. Though much evidence has been published that purports to show such a rise in agricultural wages during the later Middle Ages (in decennial means),[21] the accounts of several Winchester manors do not consistently validate that view. For example, on the Taunton manor, post-Plague casual farm-labourers enjoyed a doubling in their

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[20] See Keynes, *General Theory* (n. 1), p. 300: 'It is probable that the general level of prices will not rise very much as output increases, so long as there are available efficient unemployed resources of every type. But as soon as output has increased sufficiently to begin to reach the "bottle-necks", there is likely to be sharp rise in the prices of certain commodities...[But] the elasticity of supply partly depends upon the elapse of time.' For further arguments on these issues, see John Munro, 'The Central European Mining Boom, Mint Outputs, and Prices in the Low Countries and England, 1450 - 1550,' in Eddy H.G. Van Cauwenberghe, ed., *Money, Coins, and Commerce: Essays in the Monetary History of Asia and Europe (From Antiquity to Modern Times)* (Leuven, 1991), pp. 119 - 83; my review of David Hackett Fischer, *The Great Wave: Price Revolutions and the Rhythm of History* (Oxford and New York, 1996), reviewed for *EH.Net Review* <ehreview@eh.net>, 24 February 1999; and n. 18.

[21] See in particular David Farmer, 'Crop Yields, Prices and Wages in Medieval England', *Studies in Medieval and Renaissance History,* 6 (1983), 117-55; David Farmer, 'Prices and Wages [1042-1350]', in H. E. Hallam, ed., *The Agrarian History of England and Wales*, Vol. II: *1042-1350* (Cambridge, 1988), pp 760-78, 811-17 (Table F); David Farmer, 'Prices and Wages, 1350-1500', in Edward Miller, ed., *The Agrarian History of England and Wales*, Vol. III: *1348-1500* (Cambridge, 1991), pp.467-90, 516-24 (Tables H and I); Gregory Clark, 'The Long March of History: Farm Laborers' Wages in England 1208-1850', UC-Davis, http://www.econ.ucdavis.edu/faculty/gclark/papers/long_march_of_history.pdf; the sources cited in n. 3, 4, 8, 57, 75.

money wage, with a substantial increase as well in their real wage, from 1349 to 1356; but thereafter their money and real wages both fell, and from 1362-63 fell sharply to pre-Plague levels even in money terms. Their real wages fell even more steeply below such levels, recovering only from 1378; but their money wages did not do before 1412-13.[22] Furthermore, recently published research on agricultural production in several Winchester manors indicate that labour productivity fell rather than rose on the arable, from 1341 to 1421, while rising in pastoral farming.[23]

Second, if the logic of the Malthusian-Ricardian model (combined with the 'law of diminishing returns') clearly explains why the marginal product of agricultural labour should have risen with depopulation, such models becomes rather fuzzy in attempting to explain a comparable rise in industrial productivity, especially in the building and textile trades. In woollen-textile manufacturing, productivity in fact remained quite unchanged from the early fourteenth to the late eighteenth centuries.[24] Were there any

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[22] See Table 3: for 'hired' and not 'stipendary workers', or workers *ad tascam*; and without food or other payments in kind.

[23] David Farmer, 'The *Famuli* in the Later Middle Ages', in Richard Britnell and John Hatcher, eds., *Progress and Problems in Medieval England: Essays in Honour of Edward Miller* (Cambridge, 1996), pp. 214-20, and Table 11.4. On the selected Winchester manors, labour productivity on the arable fell from 34.3 acres per *famuli* ploughman in 1305 only marginally to 32.3 acres in 1382, but then more precipitously to 27.9 acres per ploughman in 1421, a 15.8 percent decline. In animal husbandry, the number of sheep under the care of a single shepherd (again chiefly *famuli*) rose from 231 in 1341 to 342 in 1421, a 48.1 percent increase. For some corroborative evidence on Glastonbury and Ramsey manors, see also, in this same volume, Ambrose Raftis, 'Peasants and the Collapse of the Manorial Economy on Some Ramsey Abbey Estates', pp. 191-206.

[24] In late-medieval Flanders, weaving a standard fine woollen broadcloth of 42 ells by 3.5 ells (29.4m by 2.45m = 72.0m²), containing 84 lb. or 38.2 kg of wool (16.3 kg of warp and 21.8 kg of weft), typically required about 12 - 14 days, with two weavers and a boy. Another dozen days of labour were expended in wool-beating, wool-greasing, carding, combing, spinning, reeling, and warping the yarns for the same cloth, involving about 26-30 artisans and helpers; and at least another 6 - 9 days in the finishing processes of foot-fulling (three or four days per broadcloth), napping, shearing, and dyeing. According to a Parliamentary report of the 1790s, weaving a superfine broadcloth of 34 yards (i.e. before fulling), with 80 lb. of wool (36.2 kg), then required 364 man-hours (= 14.5 days, with two weavers and a boy), and a further 888 man-hours in wool preparation, spinning, reeling, and warping, and fulling (74 days). Fulling had been mechanized in England (water-wheels) from the thirteenth century, and remained the only significantly powered manufacturing process before the Industrial Revolution. See *Parliamentary Papers*, vol. 23 (1840), 439-41 [for the years 1781-96]: report reproduced in Ephraim Lipson, *The History of the Woollen and Worsted Industries* (London, 1921), Appendix I, pp. 258-59; Walter Endrei, 'La productivité et la technique dans l'industrie textile du XIIIe au XVIIe siècle,' and Raymond Van Uytven, 'Technique, productivité, et

urban industrial crafts in which forces of later-medieval depopulation led to any truly positive qualitative changes in the composition, structure, and institutional utilization of the surviving labour force? Classical theory would suggest, however, that any rise in real wages in the agrarian sector would necessarily be translated to the other sectors, lest the latter lose labour to or from the agrarian sector (i.e. in reduced migration to towns).[25] But without real productivity increases, presumably the employment of urban industrial labour would have been restricted to those crafts in which $W_L = MRP_L$. Real urban industrial wages might have risen through a rise in *relative* industrial prices, thus increasing the employer's marginal revenue; and they would have risen further through any fall in the cost of living, chiefly in foodstuffs.

The first lesson to be learned in this study is that real-wage changes in the late-medieval economy were very complex and confusing to the observer, then and now. The other, to be seen, is not to generalize from the experience of late-medieval southern England.

Some problems with the data on long-term wage stickiness:

- **Are these wage data truly representative: do 'sticky' wages really reflect labour markets?**

Many historians, of course, have pointed out an even more serious problem: the nature of the available wage data, which seem to be very unrepresentative. For the medieval era, by far the most familiar wage data are those published late in the last century by James E. Thorold Rogers and made even more

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production au moyen âge: le cas de la draperie urbaine aux Pay-Bas,' both in Sara Mariotti, ed., *Produttività e tecnologia nei secoli XII-XVII* (Florence, 1981), pp. 253-62, 283-94; Walter Endrei, 'The Productivity of Weaving in Late Medieval Flanders,' in Negley B. Harte, and K. G. Ponting, eds., *Cloth and Clothing in Medieval 0000000Europe: Essays in Memory of Professor E. M. Carus-Wilson*, Pasold Studies in Textile History no. 2 (London, 1983), pp. 108-19; John H. Munro, 'Textile Technology,' and 'Textile Workers,' in Joseph R. Strayer, et al., eds., *The Dictionary of the Middle Ages*, Vol. XI (New York, 1988), pp. 693-715; reprinted in John Munro, *Textiles, Towns, and Trade: Essays in the Economic History of Late-Medieval England and the Low Countries* (London, 1994).

[25] Such a process would depend upon or be facilitated by the increased labour mobility that ensued from the later fourteenth century, with the breakdown of the manorial domain economies, the consequent leasing of domain lands to peasant tenants, and the decay of villeinage (serfdom). See Raftis, 'Peasants and the Collapse of the Manorial Economy', pp. 190-206; J. Ambrose Raftis, *Tenure and Mobility: Studies in the Social History of the Medieval English Village* (Toronto, 1964).

accessible in the famous wage and price indices of Henry Phelps Brown and Sheila Hopkins.[26] They themselves expressed a few reservations about the validity of these data in truly depicting long-term, downward wage stickiness:

> Certainly our method of taking a representative rate is biased towards stability ... since for most of our period these payments were made not by employers to wage-earners but by customers to craftsmen working on their own account, and these customers were generally institutions and not private persons who had to put their hands into their own pockets. But after due allowance for these things, the absence of sustained falls and of falling trends remains remarkable. It has been called the elbow-joint or ratchet effect.

Unconvinced by this argument, Peter Lindert, the eminent American economic historian, accused them of deliberately seeking wage rates that could be regarded as 'representative because they were recurrent', and then constructing their wage series 'in such a way as to overstate wage stickiness.' Nevertheless, while pleading for historians to produce 'other long-term wage series to ease the strain of over reliance on the classic Phelps Brown-Hopkins series', Lindert himself necessarily still used them, as have Wrigley and Schofield, and so many other eminent historians.[27]

In medieval economic history, however, beggars seeking statistical data cannot be choosers; and neither Thorold Rogers nor the Phelps Brown-Hopkins team had much choice. Nor have other historians in subsequent publications. The only readily available daily-wage data are those provided by such institutions capable and willing to record them over long periods of time; few if any are the records left by individual agents freely operating in the open market. Indeed, by far the great majority of labourers and craftsmen in the later-medieval and early-modern economies, and most especially those in textiles, leather-goods, metalwares, and to a large extent in agriculture as well, received piece-work wages rather than time-based wages (daily, weekly), which, when available, are often difficult to interpret. Most of our time-based

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[26] See nn. 3-4 above. The Phelps Brown & Hopkins wage data are also based on other sources drawn from Buckinghamshire, Hampshire, Sussex, and Kent.

[27] Peter Lindert, 'English Population, Wages, and Prices: 1541-1913', *Journal of Interdisciplinary History*, 15 (Spring 1985), 618-26; E.A. Wrigley and R.S. Schofield, *The Population History of England, 1541-1871: A Reconstruction* (London and Cambridge Mass., 1981; 2nd edn. with new introduction, Cambridge and New York, 1989).

wage data are limited to building craftsmen, including thatchers and street-pavers, as well carpenters, masons, tilers, plasterers, which, by no coincidence, are specifically those listed and ostensibly regulated by the famous Ordinance (June 1349) and Statute of Labourers (1350-51), and by most other late-medieval English wage legislation (except the 1388 Statute of Cambridge).[28]

In their presentation, the Phelps Brown & Hopkins wage data differ significantly from not only the Thorold Rogers wage-tables but also those published, before and since, by several other historians: in particular William Beveridge, Douglas Knoop (with G.P. Jones), Johann Schreiner, Gustav Steffen, and David Farmer, whose tables may well convince many readers that medieval wage stickiness was just a myth.[29] For their tables, whether annual or decennial, reveal almost continuous oscillations in wage-rates, sometimes small but often significant. Seemingly inexplicable, these oscillations disappear when one reads the original sources (manorial and town records) and then realizes that these historians have computed their annual data and decennial means by taking averages of the wage payments or wage rates in each record, and so producing 'compositional errors'. Consider, as an example, a building project or manorial repairs employing a dozen carpenters in the year: with three senior master carpenters earning 4½ and 5d per day, seven ordinary master carpenters earning 4d per day and two junior, less experienced master carpenters

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[28] The Ordinance of Labourers, decreed on 14 June 1349, is restated and reissued in T.E. Tomlins, J. Raithby, eds., *The Statutes of the Realm*, 6 vols., Record Commission (London, 1810-22), vol. I, 307-08; for the Statute of Labourers, 25 Edwardi III stat 2. c. 3 *Ibid*., I, 311-12; for the 1388 Statute of Cambridge, see Statute 12 Ricardi II, c.3-c.5 (1388) in *Statutes of the Realm*, II, 56-57: stipulating the annual stipends for agricultural servants and labourers, ranging from the Bailiff of Husbandry, at 13s 4d sterling per year, with clothing, to 6s 0d (72d) for 'Swineherds, Women Labourers, and Deyrie Women'. See below, n. 87.

[29] See Thorold Rogers, *A History of Agriculture and Prices in England* (n. 4); Steffen, *Studien zur Geschichte der englischen Lohnarbeiter* (n. 8); Farmer, 'Prices and Wages' and 'Prices and Wages, 1350-1550' (n. 21); Douglas Knoop and G.P. Jones, 'Masons' Wages in Medieval England', *Economic History*, 2 (Jan. 1933), 473-99 (and n. 36 below); Douglas Knoop and G.P. Jones, *The Mediaeval Mason: An Economic History of English Stone Building in the Later Middle Ages and Early Modern Times*, 3rd edn. (Manchester, 1967); William Beveridge, 'Wages in the Winchester Manors', *Economic History Review*, 1st ser., 7 (1936-37), 22-43; William Beveridge, 'Westminster Wages in the Manorial Era,' *Economic History Review*, 2nd ser., 8 (1955-56), 18 - 35; Johan Schreiner, 'Wages and Prices in the Later Middle Ages,' *Scandinavian Economic History Review*, 2 (1954), 61-73.

earning 3½d per day.[30] Their mean wage would then be 4.250d unweighted and 4.083d weighted. If, in the following year, only ten carpenters were employed, with only one senior carpenter, earning 5d per day, six earning the standard 4d per day, and three earning 3½d per day, the unweighted mean would now be 4.167d and the weighted mean, 3.950d. An examination of these accounts year after year would reveal that, for each class or status of master carpenters, the wage rates were in fact unchanging – and thus very sticky. Phelps Brown and Hopkins, to their great credit, selected for each year what appeared to be the standard or representative wage, which, admittedly, becomes a more difficult task during periods of transitional wages.

Further proof that the Thorold Rogers's and Phelps Brown & Hopkins's published wage data are indeed representative of the contemporary labour markets may be found in the wage-payment records for urban craftsmen (stone- and brick-masons, carpenters, pavers, tilers, thatchers, daubers, etc) in such medium-sized towns as Canterbury, Exeter, Dover, Winchester, and York.[31] Certainly from the post-Plague era and during the second half of the fourteenth and during the fifteenth century, their wage rates differed in no important respects from those that Thorold Rogers found in the Oxford and Cambridge college records, with generally the same degrees of long-term wage stickiness, if not for as long a period as for the Oxford

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[30] See the 1495 statute, in n. 43, below, which authorized the payment of a higher wage to those master masons and carpenters who supervised seven or more men.

[31] For the following urban and manorial records, in:(1) Archives of the British Library of Political and Economic Science, the Beveridge Price and Wage History Collection: Canterbury, 1393-1600 (Box D.3); Dover, 1227-1565 (Box H.13-14); Exeter (Exebridge Accounts), 1338-1600 (Box F.1); Westminster Abbey, 1393-1541 (Box P.10); Winchester College, 1354-1513 (Box F.8); York, 1354-1513 (Box I.10); Battle Abbey: Alciston Manor, 1336-1487 (Boxes H.10-11); Downton, 1257-1306 (Box C.157); Esher, 1257-1306, 1270-1308, and 1300-1453 (Boxes C. 157, A.31-32); Hinderclay (Suffolk), 1262-1405 (Box G.14); Itchingswell (Ecchinswell), 1270-1453 (Box A.33); Meon, 1257-1306 (Box C.157); Nailsbourne, 1257-1306 (Box C.157); Overton, 1309-1453 (Box A.33); Redgrave (Suffolk), 1323-1492 (Box G.14); Southwark (Bishop of Winchester), 1406-1454 (Box A.34); Taunton, 1270-1308, 1309-1453 (Boxes A.31-32); Wargrave, 1257-1306 (Box C.157); Witney, 1257-1306 (Box C.157); Wycombe, 1257-1306, 1309-1453 (Boxes C.147, A.33); (2) The London Guildhall Manuscripts Library: Armourers' Company Accounts (1499-1557): MS 12.065, vol. I; Bakers' Audit Books (1505-1547), MS 5174, vol. 1; Brewers' Guild, Warden's Accounts (1424-1562): MS 5440; Carpenters' Guild, Warden's Accounts (1456-1573): MS 4326, vols. I and II; Cutlers's Guild Accounts (1442-1497): MS 7146, roll 1; Grocers' Guild, Warden's Accounts (1452-1578): MS 11,570-571, vols. I - VI: Ironmongers' Guild Accounts (1455-1561): MS 11,698: Vols. I - II; Pewterers' Company Accounts (1474-1500): MS 7086, Vol. I; (3) Corporation of London Record Office: Bridge Master's Account Rolls, 1381-1398; Bridge Master's Accounts: Weekly Payment Series, 1404- 151 0 (Vols. I - III).

craftsmen. Together all these town wage-data for master building craftsmen, or post-Plague data, were or came to be about mid way between those for master building craftsmen recorded in the manorial accounts of Battle Abbey and the Bishop of Winchester's estates, at the lower end, and the wages recorded for London artisans, at the upper end. Thus, during the second half of the fourteenth century, the standard wage for master craftsmen on the Battle Abbey and Winchester rural estates was 4d per day. At Oxford and Cambridge, as noted earlier, the wages for such craftsmen had risen from 5d to 6d per day about 1363, while the wages for such building craftsmen in the other medium-sized towns listed above generally remained at 5d per day until about 1410-15, just before the wage rates for most London building craftsmen had risen from 7d or 7½ d to 8d per day; and about that same time, the manorial wage rates for these building craftsmen also rose, from the standard 4d to a now prevailing 5d per day[32].

- **Was medieval wage stickiness confined to long-term, contractual institutional employment?**

The best answer to this question, and one that further reinforces the previous answer on the representative nature of such wage data, can be derived from a comparison of wage payments in various London records, in particular those of: (1) the Tower Bridge authority (Bridge Master) (2) the various London guilds (Brewers, Cutlers, Carpenters, Grocers, Ironmongers), (3) Westminster Abbey; and (4) the Bishop of Winchester's urban Southwark manor, across the Thames from but close to the London guild houses. The Bridge Masters , in maintaining their various buildings and residential tenements, employed many craftsmen who appear to be virtually 'tenured', i.e. continuously employed for many years or decades; but the other three employers listed here hired their masons, carpenters and other such craftsmen only on a purely occasional basis, generally for just a few days at a time, on what appears to be virtually a 'spot market' for labour. For almost all such building craftsmen, in those fifteenth-century years for which a quadripartite comparison is possible, the wage data are virtually identical, and thus indicate that all four sets of London-based institutions were compelled to pay the same market wages, for both short and long-term

[32] See below pp. ,with more detailed discussion of this wage evidence.

employment.[33] Of equal interest is the fact that wages for occasionally employed craftsmen on the Bishop of Winchester's Southwark manor, in matching those paid elsewhere in London, were consequently about double those paid on his rural manors (i.e. 8d vs 5d or 4d per day in the early fifteenth century). Such evidence therefore also does not support the commonly expressed view that daily wage rates were higher for casual short-term employment than for guaranteed annual employment. That in turn casts some doubt on the ancillary view that late-medieval labourers, agricultural workers, and craftsmen came to prefer both the greater individual freedom and higher (real) rates for the former type of discontinuous employment.[34]

For the Low Countries, similar institutional sources, but most especially civic government accounts -- for Bruges, Ghent, Ypres, Mechelen, Leuven, Antwerp, Aalst (Alost) -- and some urban-based abbeys, churches, and hospitals provide even more voluminous daily-wage data to support all of these conclusions: for the very same sets of building craftsmen, and also for some policemen.[35] The wage data for such craftsmen and policemen throughout the late-medieval Low Countries, exhibit patterns very similar to those of the English artisans, as suggested earlier, most especially during periods of stable coinage, even though their governments were sensible enough never to impose wage ordinances, certainly none as restrictive as the Statute of Labourers. In most, if not in all cases, the craftsmen receiving such wages were similarly not long-term privileged employees, but those working for short-terms for many and various employers. In the

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[33] See the London sources cited in n. 31.

[34] See, in particular, John Hatcher, 'England in the Aftermath of the Black Death,' *Past & Present*, no. 144 (August 1994), pp. 3-35; Simon Penn and Christopher Dyer, 'Wages and Earnings in Late Medieval England: Evidence from Enforcement of the Labour Laws', *Economic History Review*, 2nd ser., 43:3 (August 1990), 356-76; Nora Ritchie (née Kenyon), 'Labour Conditions in Essex in the Reign of Richard II', *Economic History Review*, 1st ser., 4:4 (1934), reissued in revised form in E.M. Carus-Wilson, ed., *Essays in Economic History*, 3 vols., II (London, 1962), pp. 91-112; and n. 3.

[35] The monthly or annual wage data are found in: Stadsarchief Brugge, Stadsrekeningen 1350/51 to 1479/80; Stadsarchief Gent, Stadsrekeningen 1350/51-1479/80; Stadsarchief Mechelen, Stadsrekeningen 1350/51 to 1499/1500, nos. 44-180; Stedelijke Archief Leuven, Stadsrekeningen 1350/51 to 1499/1500, nos. 4986-5125; Algemeen Rijksarchief, Rekenkamer, reg. nos. 31,412 - 31,485 (Aalst: 1395-1500), 32,461 - 32,566 (Bruges:1406-1500); 33,147 - 33,238 (Kortrijk, 1393-1493), 38,635 - 38,722 (Ieper/Ypres: 1406-1500); and Verlinden-Scholliers, *Documents* (n. 6). Ghent wages have also been collected from the expense section of the Ghent mint accounts in ARA, Rekenkamer, reg. 18,195-200 and Acquits de Lille, liasses nos. 936-37.

woollen draperies of the late-medieval Low Countries, their predominant manufacturing industry, daily wages are available only for the fullers, since most other textile workers received piece-work wages or fees (shearers and dyers). Most fullers similarly worked for not one but a variety of different master-weaver drapers, for short and discrete periods of time. They were free to change their employers -- and they were also capable of going on strike to achieve their collective guild-wage demands, if not always successfully.[36]

■ **Was late-medieval wage stickiness the consequence of state intervention?**

Many historians, especially British economic historians, believe that, in so far as we may discern such wage stickiness, it was both the consequence of the 'wage freeze' imposed by the infamous Ordinance (1349) and Statute of Labourers (1351) and/or an artifice to evade it: i.e. payment records to simulate compliance, when employers were in reality paying more than the recorded amounts.[37] The short answer in response to such charges is that the patterns of long-term wage stickiness were virtually identical in the medieval Low Countries. In England itself, furthermore, such wage stickiness, and most especially downward wage stickiness, continued to be the prevalent feature for the employment of day labourers and artisans for centuries after such legislation – from the June 1349 Ordinance of Labourers to the 1563 Statute of Artificers (5 Elizabeth I c.4) – had become dead letters.[38]

Such answers will, nevertheless, not satisfy those historians who believe that the late-medieval records of wage-payments reflect, in some fashion, compliance with these Statutes, all the more so since Putnam, Ritchie, Hatcher, Penn and Dyer have all provided strong and convincing evidence that the crown

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[36] Fullers, organized into guilds, also received piece-work wages, but since they were required to full a cloth in three to five days, according to the size and quality, a daily-wage rate can be extrapolated. Master weavers, who were actually industrial entrepreneurs, earned their incomes as profits, while dyers and shearers, also guild-protected, earned professional fees. See John Munro, 'Industrial Entrepreneurship in the Late-Medieval Low Countries: Urban Draperies, Fullers, and the Art of Survival,' in Paul Klep and Eddy Van Cauwenberghe, eds., *Entrepreneurship and the Transformation of the Economy (10th - 20th Centuries): Essays in Honour of Herman Van der Wee* (Leuven: Leuven University Press, 1994), pp. 377-88. For the fullers' strikes, see below, pp. and n.

[37] See the sources cited in nn. 123-132.

[38] See above n. 28; and below nn. 87-88 for a further discussion of the significance of these wage statutes.

and local authorities did seek to enforce these statutes, at least until the late 1380s. Their arguments and evidence, especially Hatcher's, must be taken very seriously, even if such evidence does not really extend beyond the late fourteenth century.[39] Yet the observer may just as strongly question the longer-term success of such enforcement of wage-rate ceilings by examining more closely the manorial wage records – and thereby acquire greater confidence in their validity.

For virtually all of them demonstrate that most of the wide variety wages so recorded were substantially above those permitted by the 1349 Ordinance and the 1351 Statute of Labourers.[40] Why would they all feel free to *pay and record* these higher wages, even if a few other manors paid or recorded wages corresponding to the Statute? Furthermore, in most manors, including those in the latter small category that paid wages in accordance with the Statute, some craftsmen, evidently senior and/or more skilled, received wages that were 25 percent to 50 percent in excess of permitted rates. Did the lower wages on that smaller number of 'compliant' manors correspond to rural labour-market values and the rural cost of living?

Certainly the later-medieval English towns, with presumably a higher cost of living, readily permitted wages above those prescribed in the Ordinance and Statute of Labourers, even though they in no way exempted the towns or tolerated higher rates. In blatantly ignoring the 1349 Ordinance, the London's civic government issued its wage ordinance, the following year (1350) to fix the maximum wage for building craftsmen at 6d per summer and 5d per winter day (i.e. Easter to Michaelmas to Easter), one pence higher than the maximum summer wage permitted in the previous such ordinance of 1290, but double that permitted in the 1349 royal Ordinance and the 1351-52 national statute.[41] Not until 1495 did Parliament recognize

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[39] Hatcher, 'England in the Aftermath of the Black Death (n. 34)', pp. 3-35; see also Penn and Dyer, 'Wages and Earnings (n. 34)', pp. 356-76. The classic study remains: B.H. Putnam, *The Enforcement of the Statute of Labourers during the First Decade after the Black Death* (New York, 1908). See below, n. 87.

[40] Discussed in much greater detail below, on pp. and in nn. 86-89.

[41] H. T. Riley, ed., *Munimenta Gildhallae Londoniensis:* Vol. II: *Liber Custumarum* (London, 1860), I, 99-100; II, 541-43; H. T. Riley, ed., *Memorials of London and London Life, in the XIIIth, XIVth, and XVth Centuries: From the Archives of the City of London, A.D. 1276-1419* (London, 1868), pp. 253-55; R. R. Sharpe, ed., *Calendar of Letter-Books Preserved Among the Archives of the City of London at the Guildhall: Letter-Book G. c.A.D. 1352-1374* (London, 1905), pp. 148, 301; *Letter Book H., c.A.D. 1375-1399* (London,

London's special status within the kingdom, and its much higher cost of living, with legislation to authorize these very same rates of 6d and 5d per day, respectively (but only 4d daily with food and drink), with some minor exceptions.[42] In any event, long before then, and certainly by the 1370s, most employers of building craftsmen in London were ignoring not only the Statute of Labourers (and the 1388 Statute of Cambridge) but also the local civic ordinances on maximum wages, as the evidence just cited clearly shows.[43] Nevertheless the impact of such labour legislation cannot be fully ignored in that it may have served to restrict the full impact of those forces driving up wages, and in particular may have led to the elimination of seasonal wages, discussed in the answer to the following question.

- **Does institutional wage stickiness reflect adjustments in the real wage by other means: (1) by adjusting hours of work and thus by substituting more leisure for paid employment?**

Since medieval and early-modern employers, not only in England, but throughout Europe, paid those employees receiving time-work wages commonly by the week and then more commonly by the day, but certainly not by the hour, employers and employees could have bargained to adjust real wages, according to changing economic circumstances, by altering the length of the work -week or day. Many historians have suggested that, in pre-Industrial societies especially, many artisans, craftsmen, and labourers had a 'backward bending supply curve of labour'. Thus, many workers, on finding that their real wages had risen to permit them to acquire some desired level of sustenance and comfort, would have preferred to enjoy increased leisure time over further increases in money income; and thus they would have chosen to work less, or to refuse to work for traditionally long hours. John Hatcher has indeed recently suggested that such a substitution of leisure for paid work may have been a major component of rising real wages after the Black

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1907), p. 184. As noted below, p. and n. 91, by 1349 the higher rate was already in force at Westminster Abbey.

[42] Statute 11 Henry VII c. 22 (1495), in *Statutes of the Realm* (n. 28), vol. II, pp. 585-87. The major exception was a maximum daily rate of 7d, summer and winter, for those senior or chief master masons and carpenters employing or supervising six or more men; or a rate of 5d daily, with food and drink. See n. 30 above.

[43] See pp. and nn. 21-22 above.

Death.[44]

Indeed, several years earlier, Ian Blanchard had provided some evidence for such a 'backward bending' supply curve for labour in the late-medieval English mining industry, many of whose rural workers were seasonal, primarily engaging in the agrarian economy.[45] Obviously such circumstances would vary by time, region, and occupation. Yet there is no convincing evidence that such a backward-bending supply curve for labour was a significant feature of employment in the late medieval economy, certainly not in the building and textile trades. Some research done on this very question may be found in one of my recent publications on seasonal wages and leisure in late-medieval England and the Low Countries.[46] For neither region did I find any convincing evidence that urban craftsmen sought to increase their leisure time, even after real wages had peaked in the mid fifteenth century, by reducing either the work day or the work week, which was usually six full days.

There are, of course, only scant, sporadic data on the actual number of days worked per year, except for the invaluable data that Herman Van der Wee has provided on employment in the building trades in the Antwerp-Lier region, for each and every year from 1436 to 1600. For the base period employed in this study, 1451 to 1475, the mean number of days so worked was 210 days, precisely the same average in the late sixteenth century. The fewest number so worked, 191 days, occurred during the civil war era (towns vs Maximilian) from 1485 to 1491 (91.01 percent of this mean); the highest number, 260 days (124.0 percent of the mean), during the 1540s and early 1550s. If the scope of these data are restricted to the first full

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[44] Hatcher, 'England in the Aftermath of the Black Death (n. 34)', pp. 3 - 35.

[45] Ian Blanchard, 'Labour Productivity and Work Psychology in the English Mining Industry, 1400 - 1600,' *Economic History Review*, 2nd ser., 31:1 (February 1978), 1-24.

[46] John Munro, 'Urban Wage Structures in Late-Medieval England and the Low Countries: Work-Time and Seasonal Wages', in Ian Blanchard, ed., *Labour and Leisure in Historical Perspective, Thirteenth to Twentieth Centuries*, Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte Beiheft series no. 116 (Stuttgart, 1994), pp. 65-78.

century, 1436-1535, we find absolutely no correlation between real wages and the number of days worked.[47]

Some idea of the length of the normal working day, in this era, may be gleaned from data on seasonal wages. For in medieval and early-modern Europe, such wages were paid in accordance with the basic principle that 'man works from sun to sun'. Indeed the stipulation that both men and women were required to work at least twelve hours during summer months can be found in the 1495 parliamentary statute on maximum wages. From mid-March to mid-September all English 'artificers and labourers' were to work from 5:00 a.m. to 7:30 p.m., with 30 minutes for breakfast, 30 minutes for *nonemete* (or sleep) and one hour for dinner; and in the other half of the year, they were to work from sunrise to nightfall.[48] Certainly that customary working day and week, if not the law, prevailed in Great Britain, until the enactment of Fielden's Law or the Ten-Hour Day Act in 1847.[49] In the Low Countries, numerous fifteenth-century guild records

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[47] Van der Wee, *Antwerp Market* (n. 6), vol. I, Appendix 48, pp. 540-44 (interpolating 208 days for 1436). For this regression, $R^2 = 0.00002943$; adjusted $R^2 = -0.01017$; $F = 0.002885$.

[48] Statute 11 Henry VII c. 22, in *Statutes of the Realm* (n. 28), vol. II, pp. 585-87; repeated in 6 Henry VIII c. 3 (1514-15), in *Statutes of the Realm,* vol. III, pp. 124-26. The framers of the 1495 statute, however, evidently believed that too many wage-earners were stealing leisure time during working hours by 'late commyng unto their worke, erly departing therfro, long sitting at ther brekfast, dyner, and nonemete, and long type of sleping at after none'.

[49] See R. Campbell, *The London Tradesman [1747]* (republished New York, 1969), pp. 331-41. In specifying hours of work for 380 crafts, this treatise indicated that the typical working day still remained a very long one: from 6:00 a.m. to 8:00 p.m. (or during all 'daylight' hours). Subsequently, the 1833 Factory Act had stipulated a maximum working day of nine hours for children, aged nine to thirteen; and for those aged thirteen to eighteen, a maximum of 69 hours a week, with no more than 12 hours per day. The 1844 Factory Act limited the working day for women to 12 hours per day, and for children aged eight to thirteen, to 6.5 hours. Fielden's Act, imposing a limit of ten hours per day for both women and men (implicitly), was passed at a time of great labour unrest, on the eve of the 1848 Chartists's Revolt. See John H. Clapham, *An Economic History of Modern Britain*, vol. II: *The Early Railway Age, 1820 - 1850* (Cambridge, 1964), pp. 572-78; S.G. Checkland, *The Rise of Industrial Society in England, 1815 - 1885* (London, 1964), pp. 244-49; John Derry, *A Short History of Nineteenth-Century England* (New York, 1963), pp. 124-37, 151-54. In the U.S., New Hampshire's state legislature also enacted, in the same year 1847, a maximum ten-hour day; but the legislation applied only to women, and proved to be unenforceable. The effective state legislation dates only from 1887. See Claudia Goldin, *Understanding the Gender Gap: An Economic History of American Women* (New York, 1990), pp. 189-92, and Table 7.1; Jeremy Atack and Peter Passell, *A New Economic View of American History: From Colonial Times to 1940*, 2nd edition (New York, 1994), pp. 542-44.

affirm that the normal paid working day was then identical to the English, with a full six-day working week.[50] Far more so than in England, furthermore, the wage data for this region reveal a clear distinction between summer and winter wages (November to March); and, since the number of hours of daylight during winter months at this latitude (50° N) is about eight hours, the winter wage was only two-thirds the summer wage, despite the much higher cost of living during these cold months.

In London, and some other English towns, however, seasonal wages generally disappeared after the Black Death.[51] Quite possibly the payment of a uniform wage rate, i.e. a winter wage equal to the summer wage, came to be an acceptable method of circumventing the Statute of Labourers' wage controls, since the Statute and its enforcement really focused only the summer maxima[52]. Possibly the combination of the consequently higher wage throughout the entire year may have permitted some such substitution of greater leisure, at least in the summer months, for paid work. In the mid-fifteenth century, however, the London Bridgemaster did introduce a slight differential in seasonal payments (1441), and one that effectively raised the annual wage.[53] In the Low Countries, south and north, where seasonal wages prevailed up to the French

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[50] See Sosson, *Les travaux publics de la ville de Bruges* (n. 5): citing guild statutes in Rijksarchief Brugge, Ambachten, no. 1: 'dat hi sculdich es te werkene van nuchtens toten avonde alzo wel tsaterdaechs up vighelie avond als up anderen daghen...'Similarly the Bruges carpenters guild forbade them 'te weerkene... by avonde of bi nachte met keersen [candles]'. See other guild records that specify working hours in the textile trades (forbidding work by night), in Octave Delepierre and M.F. Willems, eds., *Collection des keuren ou statuts de tous les métiers de Bruges* (Ghent, 1842); Georges Espinas and Henri Pirenne, eds., *Recueil de documents relatifs à l'histoire de l'industrie drapière en Flandre*: Ire partie: *des origines à l'époque bourguignonne*, 4 vols. (Brussels, 1906-1920); Henri Joossen, ed., 'Recueil de documents relatifs à l'histoire de l'industrie drapière à Malines, des origines à 1384', *Bulletin de la Commission Royale d'Histoire*, 99 (1935).

[51] See however the London ordinance of 1350, in setting maximum summer and winter rates (6d and 5d respectively), cited in n. 41 above.

[52] See Table 1. The subsequent Statutes of 1444 and 1495 did more clearly specify a winter maximum wage, lower than the stipulated summer wage. In London, and possibly also in Bruges, seasonality reappeared, after the 1440s in the form of a slightly higher summer wage. See sources in nn. 31, 35, 39, 43, and 48 above.

[53] In 1441: by reducing the uniform daily rate to 7½d (or even 7d for some) for the winter season (three months), while raising it to 8½d for the rest of the year. Corporation of London Record Office, London Bridgemaster's Accounts, Weekly Payments, First Series, Vol. IV (n. 31). Unfortunately these accounts cease in 1445. See also Knoop and Jones, *Mediaeval Mason* (n. 29), pp. 105-06.

Revolution, Bruges was exceptional in generally having a uniform wage rate throughout the year; and, in the fifteenth century, Ghent also discarded seasonal wages.[54]

- **Does institutional wage stickiness reflect adjustments in the real wage by other means: (2) by adjusting the proportion of the total wage package made 'in kind'?**

According to very commonly held views about medieval and early modern wages, most artisans and labourers received a significant portion of their total wage package 'in kind' or 'in truck', so that employers adjusted the real wage by altering the amount paid in the form of food, drink, and clothing amounts. Thus, according to this same view, nominal money-wage stickiness is illusory and/or irrelevant. That some medieval wages were indeed paid partly in kind, especially in the agrarian sector, is incontestable. Most wage-payment records, including all the English statutes, are perfectly clear, however, in indicating whether the wage was in coined money alone, or 'with food' (or other benefits); and for the latter, the money wage is always proportionally less.[55] Most economic historians in publishing wage data have been equally clear in specifying that the payments were in money alone.

Across the Channel, in the towns of later-medieval Flanders and Brabant, the town accounts provide virtually no evidence of any significant wage payments made in kind; and, for the rare instances in which they do occur in the records as a *drincgeld,* they account no more than one percent of the wage packet, and

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[54] For accounts of wage payments in Bruges, see: Stadsarchief van Brugge, Stadsrekeningen 1424-25 to 1449-50. There are only occasional and sporadic indications of seasonal wages: some master masons and carpenters were paid 12d per day in December 1435, February 1436, December 1437, while some were paid 10d daily in June and September 1437, May and September 1438 (and thereafter to April 1444), in May and September 1446; and accounts for 1458-59 and 1460-61, indicate that 10d was a winter rate for street-pavers, 'paid before Easter'. *Ibid.,* Stadsrekeningen 1450/51 to 1467/68. See other sources in n. 35 above; and Jan De Vries, 'An Inquiry into the Behaviour of Wages in the Dutch Republic and the Southern Netherlands, 1580-1800,' *Acta Historia Neerlandicae*, 10 (1978), 79-97; reprinted in Maurice Aymard, ed., *Dutch Capitalism and World Capitalism* (Amsterdam, 1982), pp. 37-62; Jan De Vries, 'An Employer's Guide to Wages and Working Conditions in the Netherlands, 1450-1850,' in Carol S. Leonard and Boris N. Mironov, eds., *Hours of Work and Means of Payment: The Evolution of Conventions in Pre-Industrial Europe*, Proceedings of the Eleventh International Economic History Congress, Milan, September 1994, Session B3b (Milan, 1994), pp. 47-63; Phelps Brown and Hopkins, 'Building Wages' (n. 3), p. 172.

[55] See sources cited in n. 29, 31, 35, 39, 43, 45, and 50-51 above; nn. 84- 88 below.

seem to be for special workers hired outside the town.[56] In fifteenth-century Leiden, the fullers's guild ordinances (*keuren),* authorized by the town government (*gerecht*), are quite explicit in forbidding any payments in 'truck' (kind), stipulating that payments be made each Saturday in silver coin alone. A remnant of some former partial payment in drink evidently continued in sporadic, occasional payments of *drincgelt;* but this too was paid in silver coin (a *stuiver*, worth 2d. *groot*).[57] Similarly, in their analyses of medieval Flemish and Brabantine wages, Verlinden and Van der Wee found little evidence of payments in kind; and thus also provided only data on money wages.[58]

Nevertheless, the Flemish and Brabantine town accounts, which generally provide the full names and occupations of the craftsmen so paid, do provide evidence that many *master* masons, carpenters, slate-tilers, and street-pavers, were also industrial entrepreneurs who made substantially more money than their daily wages by selling their supplies -- bricks, stones, sand, lumber, nails, wire, etc. -- to the city government.[59] Indeed, some masters were also drapers, cloth merchants, brewers, or minor civic officials, many of whom so prospered in these roles that they ultimately relinquished their original status as daily-wage earners. Nevertheless many other minor masters and virtually all journeymen (*knapen)* and other assistants did not seem to earn any such extra incomes, though some of them may have had their own small

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[56] See sources cited in n. 35 above.

[57] See, for example, in Nicolaas Posthumus, ed., *Bronnen tot de geschiedenis van de leidsche textielnijverheid, 1333-1795*, Vol. I: *De Middeleeuwen, 1333 - 1480* (The Hague, 1910), no. 74.111-113, pp. 90-91 (Mar. 1415); no. 132.vi.9 (1436/37); no. 508:10-13, pp. 621-22: 'ende die meester sal gehouden wesen sijn volle gelt te nemen van elc laken ...dat die drapenieres hoir volres hoir volle loen geven sullen, ende alle Saterdages hoir gelt geven sullen, sonder horen volres enigerhande drinck te vercopen...' [also not: 'bier, broot, sout, kairssen, seep, butter noch kase.'] (Nov. 1478); no. 525:25, pp. 653-56 (Dec. 1478).

[58] See n. 6 above.

[59] On this issue, for early modern England, see also Donald Woodward, 'Wage Rates and Living Standards in Pre-Industrial England,' *Past and Present*, No. 91 (May 1981), 28-46; Donald Woodward, 'The Means of Payment and Hours of Work in Early Modern England,' in Carol S. Leonard and Boris N. Mironov, eds., *Hours of Work and Means of Payment: The Evolution of Conventions in Pre-Industrial Europe*, Proceedings of the Eleventh International Economic History Congress, Milan, September 1994, Session B3b (Milan, 1994), pp. 11-21; Donald Woodward, *Men at Work: Labourers and Building Craftsmen in the Towns of Northern England, 1450 - 1750* (Cambridge, 1995).

agricultural holdings, either within or just outside the town walls. Those circumstances obviously make a complete and proper estimate of real incomes difficult. As Jan Van Zanden has recently contended:[60]

> This [artisan's household] budget is made up of different sources of income, of which wage income is only one. But we assume it was an important source (and not a marginal one) for the European working classes of the early modern period. Moreover, the wage rate is exogenous for the household: it cannot influence its level in the short or the long run. This means that a rationally acting household will adapt its strategy to this given wage-level.

In manorial accounts, especially the Winchester accounts, for later medieval England, wage payments in kind were quite common up to the eve of the Black Death, often accounting for 50 percent of the total wage package; but after the Black Death the component in food and drink fell to a third or less of the total pay package and they became less common in the following generations, except principally at Battle Abbey. The Battle Abbey manorial accounts generally provide two series of wage payments for the same classes of craftsmen and agricultural workers: those paid in both money and kind, and those paid in coined money alone. The sum of the former seems to equal the latter; and the rates for those paid in money alone at Battle Abbey were identical or virtually identical to those for unspecified but presumably 'money-alone' wage payments on other manors.[61] One may surmise that when the price of foodstuffs fell sharply in the late fourteenth century (see tables), labourers and artisans would have resisted having any substantial portion of their pay package supplied in kind.

There are very few available urban wage data before the Black Death; but for later-medieval London and other smaller English towns (Canterbury, Dover, Exeter), I did not find any significant evidence of payments in kind, other than some allotments of clothing (chiefly and only significant for master-masons and some carpenters in long-term employ at Westminster Abbey).[62] For these reasons, one may conclude that wage payments in kind did not appreciably alter the picture of real wages constructed by using money

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[60] Van Zanden, 'Wages and the Standard of Living (n. 12)', p. 178.

[61] Archives, BLPES, Beveridge Price and Wage Collection, Battle Abbey: Alciston Manor, 1336-1487 (Boxes H.10-11). See also n. 31 above.

[62] Archives, BLPES, Beveridge Price and Wage Collection, Westminster Abbey: 1393-1541 (Box P.10).

payments alone, at least not for the later Middle Ages, even if such views are not endorsed in John Hatcher's recent (1994) and otherwise persuasive article discussed above.[63]

The Keynesian inflexible-wage model and the nature of medieval labour contracts

Even if these recorded nominal money-wage data reflect market conditions, and are not institutional artifices, such wages would, however, clearly not be determined in the short-run by the Classical equation: i.e. that $W_L = MRP_L$ – not then and just as certainly not now. As most contemporary macro-economists would agree, if only because of its obvious truth, 'nominal wage rates are not determined on a daily basis according to the law of supply and demand... even though it is the real wage that determines the demand for and supply of labour'; but not necessarily all of them would find the full solution in 'the modern interpretation of the Keynesian inflexible-wage model [which] focuses on the role played by labour contracts', explicit or implicit.[64]

My own current research in the late-medieval era has revealed only one form of explicit long-term wage-contracts produced by formal and arbitrated collective bargaining between a guild and an association of entrepreneurial employers: those for the aforementioned fullers of Flanders, Brabant, and Holland, whose analyses would require and justify a completely separate paper.[65] As Knoop and Jones, and more recently Heather Swanson, have shown from extensive investigations, medieval English building craftsmen did not enjoy any similar form of guild protection that would have permitted collective bargaining and labour contracts. Nevertheless Knoop and Jones have also demonstrated that for major building projects in later medieval England, France, and Italy, the chief master mason, acting more as an contractor-entrepreneur than as an artisan, often required or obtained written contracts that clearly specified not only the costs of building

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[63] Hatcher, 'England in the Aftermath of the Black Death (n. 34),'pp. 3-35.

[64] For both quotations, see David A. Wilton and David M. Prescott, *Macroeconomics: Theory and Policy in Canada*, 2nd edn. (Toronto, 1987), p. 214.

[65] See John Munro, 'Monetary Policies, Guild Labour-Strife, and Compulsory Arbitration during the Decline of the Late-Medieval Flemish Cloth Industry, 1390 - 1435': UT-ECIPA-MUNRO-98-05, http://www.chass.utoronto.ca/economics.

materials but also the rates of pay for his workers for the duration of the project. Sometimes, however, the contract was in the form of an *opus ad tascam* whose specified sum amounted to pay for piece-work accomplished, rather than daily rates.[66] Other, older master masons might rise in status to become wardens or foremen for large building projects, in the service of a secular or ecclesiastical lord, receiving a contract for many years, or even a lifetime, specifying an annual salary, with clothing and other material benefits.

Many other labour contracts may have been unwritten, i.e. the 'implicit contracts' (by 'invisible hand-shakes', etc.) about which modern macro- and labour-economists and some economic historians have published so extensively. Their analyses, however, cannot be readily applied to the often intractable medieval sources on artisans.[67] We may at least surmise that the long-term and virtually permanent artisan-employees of the London Tower Bridge Authority probably did enjoy at least the privileges of an implicit contract. But, it seems hardly credible that short-term, part-time, itinerant craftsmen, working for a variety of employers (while frequently mixing occupations), for discrete but indeterminate periods, would have benefited from any such form of implicit contracts, even if their wage patterns demonstrated the same degree of wage stickiness. In any event, fully enforceable written contracts would have succeeded, at the most, in fixing wages for only a few years at a time – or for medieval building projects, for their duration. Thus they can hardly explain these many examples of very long-term wage stickiness lasting for over half-a-century, or as much as 174 years, in that singular Oxford example just cited.

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[66] Douglas Knoop and G.P. Jones, 'The Rise of the Mason Contractor', *Journal R.I.B.A.*, Oct. 1936; Knoop and Jones, *Mediaeval Mason* (n. 29); Knoop and Jones, 'Masons' Wages in Medieval England (n. 29)', pp. 473-99; Gwilym P. Jones, 'Building in Stone in Medieval Western Europe', in M. Postan and E.E. Rich, eds., *The Cambridge Economic History of Europe*, Vol. II: *Trade and Industry in the Middle Ages* (Cambridge, 1952), pp. 493-518, esp. pp. 508-09, on 'Masons' Contracts'; Heather Swanson, 'The Illusion of Economic Structure: Craft Guilds in Late Medieval English Towns', *Past & Present*, no. 121 (November 1988), pp. 29 - 48; Heather Swanson, *Medieval Artisans: An Urban Class in Late Medieval England* (Oxford, 1989); John Blair and Nigel Ramsay, eds., *English Medieval Industries: Craftsmen, Techniques, Products* (London, 1991).

[67] Michael Huberman, 'How Did Labor Markets Work in Lancashire? More Evidence on Prices and Quantities in Cotton Spinning, 1822 - 1852', *Explorations in Economic History*, 28 (January 1991), 87 - 120; Michael Huberman, 'Invisible Handshakes in Lancashire: Cotton Spinning in the First Half of the Nineteenth Century,' *Journal of Economic History*, 46 (1986), 987-98; Michael Huberman, *Escape from the Market: Negotiating Work in Lancashire* (Cambridge, 1996).

Nevertheless, in the absence of good data and theory, one may still offer credible (rather than merely plausible) hypotheses to explain at least some forms of wage stickiness. During periods of inflation, most employers were reluctant to award nominal wage increases that matched rising consumer prices and living costs, especially if the prices of their own products were not rising as steeply as were food prices. Despite the emphasis to be given to deflationary periods in this analysis, certainly continental western Europe, during the Hundred Years' War era especially (1337-1453), experienced frequent, if short term, inflations from periodic war-induced coinage debasements. With so many jagged oscillations in prices, we, as modern computer-assisted observers, are better able to detect those trends than were medieval employers. If late-medieval England had less frequent short-term inflations, possibly the Statute of Labourers, whatever its real impact, did reinforce a psychological resistance to, or 'moral suasion' against, awarding any wage increases. Nor is the employer likely, then or now, to encounter much resistance from labour in such an inflationary situation, despite the necessary fall in its real wage. As Keynes noted, in citing one of his chief objections to one of the prime 'postulates' of Classical theory: 'A fall in real wages due to a rise in prices, with money-wages unaltered, does not, as a rule cause the supply of labour available on offer at the current [money] wage to fall below the amount actually employed prior to the rise of prices'.[68] Indeed modern macro-economic models convincingly demonstrate that under such inflationary conditions wage stickiness 'results in an increase in employment and output', and usually, though not necessarily, in employer profits.[69]

Conversely, during periods of deflation, most wage-earning employees, whether or not they were truly suffering from a 'money-illusion', were and still are extremely hostile to any attempts to reduce their nominal wages, even if, with some inevitable wage reductions, they still ended up better off in real terms. Workers surely had and do have some legitimate concern that wage rates and other benefits once cut will not readily be restored, without some considerable struggle, once market conditions improve and prices begin to rise. As Keynes also cogently remarked: 'Every trade union will put up some resistance to a cut in

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[68] Keynes, *General Theory* (n. 1), pp. 12-13.

[69] *Ibid.*; and Wilton-Prescott, *Macroeconomics* (n. 64), pp. 216-17.

money-wages, however small.'[70]

In late-medieval Flanders and Holland, that is precisely what the fullers did, in the form of organized strikes (*uutgangen*), when faced with minor wage reductions during periods of monetary reform and deflation.[71] If other late-medieval wage-earning craftsmen, in both England and the Low Countries, did not enjoy similarly strong guild protection, undoubtedly many, with or without less formal organizations, were still able to convey their opposition with sufficient conviction or hostility to prevent any nominal-wage reductions. Obviously those unprotected, such as itinerant or part-time agricultural labourers, were much more likely to suffer nominal-wage cuts during periods of deflation, as seems to have been the case in both late-medieval England and Flanders[72].

Money, prices, and wages before the Black Death (England, 1280-1348)

What then do the medieval wage and price data reveal about the nature of longer-term wage stickiness, and its results, especially *downward* wage stickiness during deflations – i.e. the ratchet effect? The long-term historical evidence for both England and the Low Countries does indeed indicate that wage rigidity was more pronounced during these deflations, but far more so during the later-medieval deflations.

For proper historical perspective, one should commence this analysis with thirteenth-century England, which offers the historian by far the most plentiful data. Contrary to much of the economic history literature, however, and indeed to one's rational expectations, the inflationary final decades of this century do not reveal any truly distinct trend of falling real wages – and indeed none subsequently, before the Great Famine era (1315-22). Thereafter, in the decades following the Great Famine, we witness one of the most

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[70] Keynes, *General Theory* (n. 1), p. 15. Cf. also Wilton-Prescott, *Macroeconomics* (n. 64), p. 215, in commenting on the 'the very deep recession of 1982', when the International Woodworkers 'resisted wage cuts at sawmills in British Columbia. The union took the view that if the weakest firms succeeded in getting wage concessions in order to maintain employment, then all firms would demand the same concessions and all workers would suffer. Moreover, the union would have to fight battles already won in order to restore wage and benefit levels once market conditions improved'; and thus 'wage cuts were resisted and many sawmills were closed'.

[71] See above, n.27; and below, pp. and nn. 77-78.

[72] See below, pp. and nn. 138-42.

striking and puzzling phenomena in all of England's recorded monetary and price history: (1) a severe, indeed dazzling, plunge in English mint outputs, still entirely in silver; and, accompanying that, (2) an almost equally drastic deflation, reflected in the 35 percent fall in the Phelps Brown-Hopkins index, from 138 in 1321-25 to just 90 in 1341-45, on the eve of the Black Death.

Postan, of course, evidently wanted to attribute the fall in at least the grain-price index to the demographic consequences of the Great Famine, or rather to a more general Malthusian crisis of overpopulation in a relatively primitive agrarian economy: 'when the poorer lands, no longer new, punished the men who tilled them with failing crops and with murrain', so much so as 'to send the population figures tumbling down'.[73] Lawrence Poos has recently provided evidence to indicate significant population decline in rural Essex after the Great Famine and on into the post-Plague era.[74] For Europe more generally one can cite evidence for regional depopulations in early-fourteenth century Provence and Tuscany, though evidently related to the horrendous warfare then afflicting these regions.[75] Bruce Campbell, however, has provided equally compelling evidence of continued population growth in Norfolk, while also demonstrating in various articles that late-medieval English agriculture was far less primitive and far less prone to Malthusian pressures than Postan had suggested.[76] Richard Smith's masterful survey of 'demographic developments in

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[73] Postan, 'Economic Foundations of Medieval Society (n. 13)', p. 14.

[74] Lawrence R. Poos, 'The Rural Population of Essex in the Later Middle Ages,' *Economic History Review*, 2nd ser. 38 (November 1985), 515 - 30; Lawrence R. Poos, *A Rural Society after the Black Death: Essex, 1350 - 1525* (Cambridge, 1991).

[75] David Herlihy, *Medieval and Renaissance Pistoia: The Social History of an Italian Town, 1200 -1430* (New Haven, 1967), pp. 55-77; David Herlihy and Christiane Klapisch-Zuber, *Tuscans and Their Families: A Study of the Florentine Catasto of 1427* (New Haven, 1985), pp. 232-79; John Munro, 'Industrial Transformations in the North-west European Textile Trades, c.1290 - c.1340: Economic Progress or Economic Crisis?', in Bruce M.S. Campbell, ed., *Before the Black Death: Studies in the 'Crisis' of the Early Fourteenth Century* (Manchester and New York, 1991), pp. 110 - 48; and also, in this volume, Barbara Harvey, 'Introduction: the 'Crisis' of the Early Fourteenth Century,' pp. 1 - 24.

[76] Bruce M. Campbell, 'Agricultural Progress in Medieval England: Some Evidence from Eastern Norfolk,' *Economic History Review*, 2nd ser. 36 (Feb. 1983), 26-46; Bruce Campbell, 'Arable Productivity in Medieval England: Some Evidence from Norfolk,' *Journal of Economic History*, 43 (1983), 379-404; Bruce Campbell, 'Population Pressure, Inheritance, and the Land Market in a Fourteenth-Century Peasant Community,' in Richard M. Smith, ed., *Land, Kinship and Life-Cycle* (Cambridge, 1984), pp. 87 - 134; and

rural England, 1300-48', while inconclusive, noting complex regional variations in demographic decline, with continued if slow growth, or stagnation, does not lend any support to Postan's drastic views[77]. Nor do the nominal-wage data support the depopulation hypothesis; and the fall in prices was general, and not, as Table 2 demonstrates, limited to just grains.

This prolonged fall in prices was instead genuine deflation, for which monetary reasons must be sought. The true explanation for this evidently stark monetary contraction and deflation, apparent also from the Tuscan price data,[78] remains a mystery that cannot satisfactorily be resolved. Possibly it was due to a *relative* scarcity of precious metals, if, as several historians have asserted, the major German and Central European silver mines had begun to experience not just diminishing returns but serious physical depletion by the early fourteenth century, while the European economy continued to grow, and with it, the aggregate demand for coined money. [79] Indeed, as Nicholas Mayhew has also demonstrated, contrary to another of Postan's assertions, coined money is perishable to some considerable degree: from wear, tear, and normal loss in circulation, from shipwrecks, unrecovered hoards, conversion into jewellery and plate, etc., so that

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Bruce Campbell, *English Seigniorial Agriculture, 1250 - 1450*, Cambridge Studies in Historical Geography no. 31 (Cambridge and New York, 2000).

[77] Richard Smith, 'Demographic Developments in Rural England, 1300-48: a Survey,' in Campbell, ed., *Before the Black Death* (n. 75), pp. 25 - 78; see also Harvey, ' "Crisis" of the Early Fourteenth Century (n. 75)', pp.1-23 ; Barbara Harvey, 'The Population Trend in England Between 1300 and 1348', *Transactions of the Royal Historical Society*, 5th ser., 16 (1966), 23-42, with a much stronger attack on Postan's thesis, denying any evidence of population decline before the Black Death; and see also Hallam, 'Population Movements in England, 1086-1350' (n. 14), pp. 508-93, also casting doubts on general population decline before 1348. But also note Richard Smith's criticisms of Hallam's data.

[78] Herlihy, *Medieval and Renaissance Pistoia* (n. 75), pp. 122-25.

[79] i.e. if $\Delta \mathbf{y} > \Delta$ (M.V) $\rightarrow \triangledown$P. See Peter Spufford, *Money and Its Use in Medieval Europe* (Cambridge, 1988), pp. 267-82 ; John U. Nef, 'Mining and Metallurgy in Medieval Civilization', in M.M. Postan, ed., *Cambridge Economic History of Europe*, Vol. II: *Trade and Industry in the Middle Ages* (1952), pp. 456-69; revised edn. (1987), pp. 696-734; D. Kovacevic, 'Les mines d'or et d'argent en Serbie et en Bosnie médiévales', *Annales: E.S.C.*, 15 (1960), 248-58; Philippe Braunstein, 'Innovations in Mining and Metal Production in Europe in the Late Middle Ages,' *Journal of European Economic History*, 12 (1983), 573-91; Ekkehard Westermann, 'Zur Silber- und Kupferproduktion Mitteleuropas vom 15. bis zum frühen 17. Jahrhundert: über Bedeutung und Rangfolge der Reviere von Schwaz, Mansfeld und Neusohl,' *Der Anschnitt: Zeitschrift für Kunst und Kultur im Bergbau*, 38 (May-June 1986), 187 - 211; Munro, 'The Central European Mining Boom (n. 20)', pp. 119-83. See also n. 18 above, n. 105 below.

the money supply will indeed contract if not continually replenished with fresh minting.[80] For England itself, some historians have also suggested that the crown's foreign military expenditures (under both Edward II and Edward III) had led to major outflows of bullion, though the fall in mint-outputs and the onset of deflation seems to precede the evidence for any such drastic bullion outflows.[81] Finally, since England in this era was minting only silver, and no gold before January 1344 (none since 1257), the very dramatic rise in the bimetallic ratio, from about 12.0:1 in the 1290s to 14.2:1 in the mid-1320s may have instigated a large outflow of silver coinage to acquire the higher valued gold. Indeed, such bullion movements may have been necessary to permit England's inauguration of an effective gold coinage in the period 1344-52, though with a then falling bimetallic ratio.[82]

Some very general indication of possible bullion outflows from England and a relative scarcity of specie during the second quarter of the fourteenth century may be found in the coinage-output statistics (Table 9). The mean annual values of those outputs (all in silver) fell from a peak of £125,836 sterling in 1306-10 to a nadir of £381 in 1326-30; recovering only to a mean of £7,091 in 1346-50, at the outbreak of

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[80] See Nicholas Mayhew, 'Numismatic Evidence and Falling Prices in the Fourteenth Century', *Economic History Review*, 2nd ser. 27 (1974), 1-15; John Munro, 'Bullion Flows and Monetary Contraction in Late-Medieval England and the Low Countries,' in John F. Richards, ed., *Precious Metals in the Later Medieval and Early Modern Worlds* (Durham, 1983), pp. 97-158; reprinted in John Munro, *Bullion Flows and Monetary Policies in England and the Low Countries, 1350-1500* (London-Aldershot, 1992).

[81] Michael Prestwich, 'Currency and the Economy of Early Fourteenth-Century England', in Nicholas Mayhew, ed., *Edwardian Monetary Affairs, 1279-1344* (British Archeological Reports, BAR International Series, no. 36 (Oxford, 1977), pp. 45-58; Edward Ames, 'The Sterling Crisis of 1337-1339,' *Journal of Economic History*, 25 (1965), 496-552, reprinted in Roderick Floud, ed., *Essays in Quantitative Economic History* (Oxford, 1974), pp. 36-58; Mavis Mate, 'High Prices in Early Fourteenth-Century England: Causes and Consequences', *Economic History Review*, 2nd ser. 28 (1975), 1-16; Robinson, 'Money, Population, and Economic Change (n. 18)', pp. 63-76; Peter Spufford, *Money and Its Use* (n. 79), pp. 267-88.

[82] The fall in the bimetallic ratio may have been due to both declining silver outputs from Bohemian mines and increasing supplies of West African (Sudanese) and Hungarian gold. See especially Frederic Lane, 'The First Infidelities of the Venetian Lire,' in Harry A. Miskimin, David Herlihy, and A. L. Udovitch, eds., *The Medieval City* (New Haven and London, 1977), pp. 52-9; Peter Spufford, *Handbook of Medieval Exchange*, Royal Historical Society Guides and Handbooks no. 13 (London, 1986), Graph 3 and Table II, pp. li-lxiii; Spufford , *Money and Its Use* (n. 79), pp. 267-88 (on 'the victory of gold'), 340-42. Spufford's dates have been adjusted by those of Lane. See also Mavis Mate, 'The Role of Gold Coinage in the English Economy, 1338 - 1400', *Numismatic Chronicle*, 7th ser. 18 (1978), 126-41.

the Black Death. Such mint-accounts provide, however, only a very general and very tenuous guide to current monetary conditions. They can be of some value in that years with very low mint outputs generally coincide with eras of prolonged deflation (marked as well by complaints about the scarcity of specie); and, conversely, years of very high mint outputs generally coincide with eras of prolonged inflation. But extrapolating a nation's current money supply from these accounts is an enterprise fraught with great dangers, for many complex reasons, the most important of which is that mint-accounts combine stocks and flows in unpredictable and unquantifiable fashions.[83] Nevertheless, some brave historians believe that a 30-year running average of such outputs may provide an acceptably reliable indication of the coined money stock. Recently, two economic historians have used a combination of mint accounts and coin hoards to show that the English money supply contracted by over one half in this era.[84]

What is especially striking and peculiar about this deflation, though affording further evidence that it was a genuine deflation, was the marked decline in nominal wages shown in the accompanying tables. From about 1337 to 1340, the mean money wage of a master building craftsmen in southern England fell from 4d per day to 3d per day, a decline of 25 percent; and that very low mean wage-rate was maintained

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[83] An absence of minting may indicate only that the nation's mints were offering a mint price for bullion uncompetitive with those of neighbouring foreign mints. With coinage debasement in a bimetallic system (in England, after 1344), a coinage debasement in, say silver, might succeed in recoining much of the current silver monetary stock, in inducing dishoarding, and in attracting foreign bullion, but at the expense of losing the now 'disfavoured' gold to foreign mints. See the essays in Munro, *Bullion Flows and Monetary Policies* (n. 79), and in n. 20 and 79. Graphs for England and the Low Countries, each portraying aggregate mint outputs in current money-of-account and the 'basket of consumables' price indices do show a strikingly close relationship, with about a five-year lag in prices. See Figures 33-34 in pfd format in http://www.economics.utoronto.ca/munro5/RWCharts3.pdf

[84] Nicholas Mayhew, 'Money and Prices in England from Henry II to Edward III', *Agricultural History Review*, 35:2 (1987), Table I, p. 125: indicating that the coined money supply contracted from about £1,100,00 sterling in 1311-24 to just £500,000 in the 1340s. See also Nicholas Mayhew, 'Population, Money Supply, and the Velocity of Circulation in England, 1300 - 1700,' *Economic History Review*, 2nd ser., 48:2 (May 1995), 238-57; Mayhew, 'Numismatic Evidence and Falling Prices (n. 79)', pp. 1-15; and sources in n. 80 above. For a more recent estimate, see : Martin Allen, 'The Volume and Composition of the English Silver Currency, 1279 - 1351', *British Numismatic Journal*, 70 (2000), forthcoming; and Martin Allen, 'The Volume of the English Currency, 1158 - 1470', *Economic History Review*, 2nd ser., 54 (2001), forthcoming, Table 1: an estimated coined silver stock of £1,900,000 - £2,300,000 in 1319, falling to about £700,000 - £900,000 in 1351.

until early 1351, i.e. several years after the Black Death.[85] The only other period in recorded English price-history with any such decline in the nominal wages of building craftsmen came almost six-centuries later: the post-World War I slump of 1920-23 (31.3 percent decline) and the early depression years of 1929-34 (8.3 percent decline). [86] In the earlier part of this early-fourteenth century period, before this fall in nominal wages, i.e. with continued nominal wage rigidity,[87] real wages did rise, though the brief rise appears to be dramatic only because of the recovery from the drastic nadir of the Great Famine years. When the real-wage of those master craftsmen peaked in 1334-35, it was not appreciably higher than in the very early years of the century (1303-07). Then their real wages suffered a sharp fall, indeed fell quite steeply before the Black Death, with the initial recovery of the price level from 1344, and especially with the inflation that soared immediately after the Black Death, one that endured for a full generation.

Money wages and the statute of labourers following the Black Death (1348)

That is why the Ordinance (1349) and Statute of Labourers (1350-51) were so very unreasonable and cruel, but also so difficult to enforce: in attempting to fix money-wages at the pre-Plague level, when both money and real wages had been so unusually low.[88] Thus, specifically forbidding anyone to offer or accept any wages higher than those prevailing in 1346 (20 Edwardi III), the Statute of Labourers set the maximum

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[85] See the sources cited above in nn. 3-4. Wages for masons and carpenters at the Oxford colleges did not fall, however; and remained at the daily rate of 4d set from at least 1300.

[86] Phelps Brown and Hopkins, 'Building Wages' (n. 3), Table 1, p. 178.

[87] Money wages for master masons and carpenters were typically 3d. per day from before 1264 to 1302; for many, 3.5d until 1310; and then 4d. until 1338. See n. 3 above.

[88] For other analyses of medieval English wages before and after the Black Death, see in particular Farmer, 'Wages and Prices, 1042-1350 (n. 21)', pp. 760-78, 811-17; Farmer, 'Prices and Wages, 1350-1500 (n. 21)', pp. 467-83 (whose conclusions do not always match my own); and sources cited above in nn. 3, 4, 8, 21, 30, 34. For the more general economic and social consequences of the Black Death, see: Hatcher, 'England in the Aftermath of the Black Death (n. 34)', pp. 3 - 35; Hatcher, *Plague, Population, and the English Economy* (n. 12), pp. 11 - 73; Colin Platt, *King Death: The Black Death and Its Aftermath in Late-Medieval England* (London and Toronto, 1996), pp. 1-47, 177-92; J. L. Bolton, 'The World Upside Down': Plague as an Agent of Economic and Social Change', in Mark Ormrod and Phillip Lindley, eds., *The Black Death in England* (Stamford, 1996), pp. 17-78; Putnam, *The Enforcement of the Statute of Labourers* 9n. 39); Penn and Dyer, 'Wages and Earnings in Late Medieval England (n. 34)', pp. 356-76.

summer wages (Easter to Michaelmas) for master masons, carpenters, and tilers, 'without meat or drink', at 3d per day; for their servants and labourers, at 1½ d a day; but it also permitted a rate of 4d per day for master free-masons.[89] This obnoxious statute remained in force (reconfirmed numerous times), ostensibly on a national basis, until 1444, when Parliament finally raised the maximum daily rate for such craftsmen to 5½ d for summer and 4½ d for the winter season, without food and drink (or: 4d and 3d, respectively, with food and drink).[90] As noted earlier in this study, London had independently, in 1350, established its own maximum wage of 6d per summer and 5d per winter day for these same craftsmen;[91] and such rates were already in force at Westminster Abbey, for master building craftsmen in 1349.[92]

Thereafter, but *not* immediately after the Black Death, money wages did rise, certainly for these urban-based craftsmen.[93] At Oxford, where most building craftsmen had not suffered the nominal wage cuts in the 1330s, the prevailing daily wage rate rose from 4d to 5d during the 1350s; in other small-sized towns the rate rose from 3d to 5d by the end of the decade. Not until 1363, as noted before, did Oxford masons and carpenters gain the daily rate of 6d, at least for summer work, that London had authorized in 1350; and not until about 1407-1409 did the mean daily rate for craftsmen in the other smaller towns achieve the same 6d level, i.e. the mean rate for the Phelps Brown & Hopkins index, unchanged in their own index until 1536.

In many, indeed evidently most, of the Winchester manors and at Battle Abbey, the daily wage for

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[89] Statute 25 Edwardi III stat. 2 c. 3, in *Statutes of the Realm* (n. 28), vol. I, pp. 311-12. See also n. 29 above. Wages for the winter season from Michaelmas to Easter were not specifically stipulated, except that they were to be 'less according to the rate and discretion of the justices'. For a discussion of this Statute, and the subsequent labour legislation, see Farmer, 'Wages and Prices, 1350-1500 (n. 21)', pp. 483–90.

[90] Statute 23 Henrici VI c. 12 (1444-45), in *Statutes of the Realm* (n. 28), vol. II, 337-39. See above nn. 41, 51.

[91] See above pp. and n. 41. As also noted there, these rates were just 1d per day higher than those of 1290.

[92] Archives, British Library of Political and Economic Science, Beveridge Price History Collection, Box P9.

[93] Cf. Beveridge, 'Wages in the Winchester Manors (n. 29)', pp. 26-8: cf. his comments on 'the failure of the Black Death to cause any immediate change of [wage] rates' in the Winchester manorial accounts of 1349-50.

such building craftsmen, while soon rising back to the 4d level that had prevailed from about 1310 to 1337, remained fixed at that truly low level -- even if 25 percent above that stipulated by the Statute of Labourers, with some occasional exceptions for senior craftsmen at 5d daily, until about c.1410-c.1425.[94] As also noted above, the wages of occasional day labourers, chiefly agricultural, on Taunton manor, after doubling in the years following the Black Death (1349-1356), then fell to the pre-Plague level of 1d daily, remaining there until 1412-13.[95] Such evidence may lend support to oft-cited contention of G.A. Holmes that by the 1370s (and on the eve of the Peasants' Revolt) the landlords or the great landed magnates had succeeded in obtaining a greater share of the national income than they had enjoyed before the Black Death.[96]

Nora Kenyon Ritchie, however, did find a few examples of supposedly higher rates, though largely for agricultural workers, given in some Essex manors in the late 1380s. Furthermore, such evidence comes from judicial proceedings and not from account rolls. Nevertheless her hypothesis is certainly one to be considered: that aggressive new leaseholders of former demesne lands were more willing to offer higher wages to attract labour than were traditional manorial lords. Rather surprisingly, no one has pursued or investigated this intriguing thesis since the publication of her article, in 1934.[97]

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[94] See n. 31 for the Beveridge Price and Wage History Collection, in the BLPES (LSE) Archives. At Battle Abbey (Box. H:10-11), carpenters and masons had their pay raised from 4d to 5d daily in 1425; at Itchingswell (Box A.33:159432), from 1433; but at Overton (Box A.33:159406), and Wycombe (BoxA.33:159407) first carpenters and then masons enjoyed the same increase from 4d to 5d as early as 1401-05. At the urban Winchester College (Box F.8), wages for master carpenters had risen to 6d per day without food by 1398 (4d daily with food); but for master masons, the mean rate did not reach 6d daily (without food) until 1409. See also the raw-wage data published in Thorold Rogers, *History of Agriculture and Prices* (n. 4), vol. II:*1259-1400*, pp. 272-34; and vol. III:*1401-1582*, pp. 583-663.

[95] See Table 3 and n. 22 above.

[96] G.A. Holmes, *The Estates of the Higher Nobility in Fourteenth-Century England* (Cambridge, 1957), p. 115; see also pp. 85-120; Richard H. Britnell, 'Feudal Reaction after the Black Death in the Palatinate of Durham,' *Past & Present*, no. 128 (August 1990), pp. 28-47; and n. 142 below.

[97] Ritchie (née Kenyon), 'Labour Conditions in Essex (n. 34)', pp. 91-111. Data from presentments before Justices of the King's Bench at Brenwood in November 1389, following the 1388 Statute of Cambridge (see n. 44 above). As she also notes (p. 102), 'eight hundred men who were receiving illegally high wages is not a large number for a country the size of Essex.' She also noted daily wage payments of 4d with food, for tasks in the Winchester manorial accounts that are specifically listed as 'without food'. See nn. 47, and, for a rather different view about wage rates in this era, n. 86.

London's own 1350 wage ordinance was soon if not immediately allowed to lapse. For when the Tower Bridge accounts commence in 1381, the prevailing daily rate then ranged from 7 d to 7½ d, and indeed for winter months as well as for the summer. At Westminster Abbey, however, the rate was less, at 6 2/3d per day, though with some extra material benefits not given to the Tower Bridge craftsmen. In the Bishop of Winchester's Southwark manor, from as early as 1406, and in most London guildhouses by 1420, that rate had increased to 8d daily (without food and drink); and that same rate had become uniform in the Tower Bridge Master's accounts from June 1425 (though not at Westminster Abbey until 1439-40, perhaps because its master craftsmen had continued to receive some extra material benefits from the Abbey, along with their money wages).[98]

Money, prices, and real wages in England after the Black Death: the inflation of 1349 - 1376

These rather complex data indicate that the commonly expressed views about post-Plague wages in England are much oversimplified, in particular the comment in a recent article by Simon Penn and Christopher Dyer: that 'the evidence for a rise in both cash wages and real wages ...coinciding with the sudden and sustained population decline after the Black Death of 1348-9 has been well established'.[99] What must be challenged in this statement (and article) is the verdict on real wages, for the very simple reason that the Black Death, not only in England but throughout western Europe, was followed by a horrendous inflation that lasted for at least the ensuing quarter-century. Thus, as the Tables 2 - 8 clearly indicate, its initial consequence was to swamp the rise in nominal wages for most workers, most especially for Flemish craftsmen, but even for England's urban craftsmen (certainly in the small to middle-sized towns), and certainly for most of the manorial craftsmen and other artisans. As Table 2 indicates, the real wages for

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[98] Corporation of London Record Office, Bridgemaster's Accounts, Weekly Payment Series, Vols. III - IV; Corporation of London Record Office, London Bridgemaster's Accounts, Weekly Payments, First Series, Vol. IV. Unfortunately these accounts cease in 1445. See also Knoop and Jones, *Mediaeval Mason* (n. 29), pp. 105-06. Account books of London guildhouses cited in n. below. Subsequently, from 1441, the craftsmen employed Tower Bridgemaster received a very minor seasonal adjustment in wages: a reduction in the daily rate for a now shorter winter season, to 7.5d but an increase to 8.5d for the rest of the year, thus slightly increasing the annual wage payments. See a discussion of these accounts in pp. above.

[99] Penn and Dyer, 'Wages and Earnings in Late Medieval England (n. 34)', pp. 356-76.

master masons and carpenters at Oxford, and Cambridge (Canterbury and Exeter, etc.) fell, not rose, in the immediate aftermath of the Black Death and then recovered somewhat during the 1350s, only to decline again slightly in the 1360s. They did not in fact regain the level that had been achieved in the mid-1330s until about the mid-1370s. Many manorial craftsmen in many manorial estates, especially those of the far flung holdings of the Bishop of Winchester, had to wait until the early fifteenth century to achieve a significant gain in their real incomes (at least those measured in terms of wages given without food and drink): at Battle Abbey, Redgrave manor, Hinderclay, Itchingswell (Ecchinswell), Overton, Taunton, Esher, Wycombe, and also Winchester College, to name only a few.[100]

The post-Plague European inflation, which, as a comparison of the Tables 2, 4, and 9 reveals, was even more severe and longer lasting in Flanders than in England (and in Tuscany, as well), was again clearly a monetary phenomenon. Depopulation, after all, according to some disciples of the Postan school, is supposed to cause deflation, not the opposite. The monetary reasons – if we properly relate monetary and real variables – are not difficult to seek. As David Herlihy so aptly commented, 'men were dying, but coins were not' (at least not so quickly).[101] Thus, whatever the current status of western European precious-metal mining, the effect of such drastic depopulations, perhaps as much as 40 percent of the total inhabitants, from bubonic and pneumonic plagues, if not so much from warfare, was undoubtedly to augment dramatically the per capita supplies of coined money. In terms of the modernized version of the Fisher Identity, i.e. **M.V = P.y**, if the real variable **y**, representing Net National Income, contracted so much more rapidly than did the volume of money payments (ie. the product of **M.V**), then obviously prices had to rise. The same conclusions are to be drawn in using the preferable Cambridge 'cash balances' approach: so that **M = k.P.y** (and thus k = 1/V).

Secondly, the fiscal consequences of warfare in western Europe (including the concurrent Italian

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[100] Beveridge Price and Wage History Collection, Archives BLPS: boxes A.31 (Taunton), A.32 (Esher), A. 33 (Itchingswell, Overton, Wycombe), F.8 (Winchester College), G.14 (Hinderclay and Redgrave), H.10-11 (Battle Abbey).

[101] Herlihy, *Medieval and Renaissance Pistoia* (n. 75), p. 125.

wars), of increased taxes and other levies, probably also induced some considerable dishoarding. At the same time the French, Flemish, Brabantine, Aragonese, and various Italian governments, to mention only a few, sought both to finance and to facilitate the necessary cash flows for warfare by engaging in drastic coinage debasements, some severe enough to promote a veritable 'flight from coinage'. The English crown, however, was a singular exception to these monetary manipulations: for it undertook only one, relatively minor weight-reduction in its silver coins, in 1351, thereafter maintaining a perfectly stable coinage, in both metals, until 1411-12 (Table 9).[102]

Thirdly, as some historians have suggested, citing Italian literature -- e.g. Boccaccio's *Decameron* -- and paintings, adornments in dress and housing, the socio-psychological consequences of both plague and warfare, especially with such devastating and arbitrary death tolls, was to foster a fatalistic yet hedonistic spending spree, facilitated all the more by suddenly inherited cash balances.[103] The overall consequences, as demonstrated in the Tables 2, 4, and 9, for England and Flanders, was to produce a truly momentous increase in coinage outputs, whose inflationary consequences can hardly be disputed. One will note from the price-tables for both countries that all three major price series, and not just those for grains, rose during this quarter-century period following the Black Death: to the late 1370s in England; and to the 1380s in Flanders, whose far more drastic and regrettably frequent debasements continued until the 1389-90 monetary reform.

'Bullion famines' and periodic deflations in the late-fourteenth and fifteenth centuries

Thereafter, during the final quarter of the fourteenth-century, much of western Europe -- certainly including England, the Low Countries, Tuscany, and Aragon-Navarre -- experienced an equally dramatic

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[102] See Albert Feavearyear, *The Pound Sterling: a History of English Money*, 2nd edn. revised by E.V. Morgan (Oxford, 1963), pp. 15-45; essays in Munro, *Bullion Flows and Monetary Policies* (n. 79); and sources in n. 104 below.

[103] See in particular: Harry Miskimin, *The Economy of Early Renaissance Europe, 1300 - 1460* (Cambridge, 1975), pp. 25-32; Herlihy, *Medieval and Renaissance Pistoia* (n. 75), pp. 55-71, 180-212; Robert Lopez, 'Hard Times and Investment in Culture', in Wallace Ferguson, et al., eds., *The Renaissance* (New York, 1962), pp. 29-52; Giovanni Boccaccio, *The Decameron*, trans. J.M. Rigg (London, 1921): introduction, esp. p. 7; Anthony Cassell, 'Boccaccio, Giovanni', in Joseph Strayer, et al, eds., *Dictionary of the Middle Ages*, Vol. 2 (New York, 1983), pp. 277-90.

deflation that lasted until well into the fifteenth century (Tables 2, 4, 8, 9).[104] The extent of deflation became much more moderate by the early fifteenth century. Then with the resumption of intensive warfare, from the Battle of Agincourt in 1415 to the dénouement of the Hundred Years' War in the 1440s, another era of inflation ensued in much of north-western Europe, especially in France and the Low Countries, which consequently experienced severe coinage debasements. With the end of the Hundred Years War, and indeed even earlier, from the early 1440s, that war-induced inflationary era was succeeded by yet another era of deflation, this time as prolonged, and by the 1460s, as pronounced as that of the late fourteenth century. Though temporarily disrupted by warfare, by other 'supply shocks', and again by severe coinage debasements, especially in the Low Countries during the 1480s, this deflationary trend lasted until about 1515. Its subsequent reversal marked the beginning of the Price Revolution era. Again, as in all the previous inflationary and deflationary cycles, the three major price-indices rose in both England and the Low Countries fell more or less together in tandem during all these fifteenth-century cycles (Tables 2, 4, 8, 9).

As these tables show clearly, these periods of very pronounced deflation, in the later fourteenth and mid fifteenth century in particular, were accompanied by severe slumps in the gold and silver coinage outputs in both England and the Low Countries, almost as severe as those for early fourteenth-century England, while the brief intervening periods of inflation were similarly accompanied by upsurges in mint outputs.[105] If these brief, periodic bouts of late-medieval inflation can be attributed to a combination of

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[104] Herlihy, *Medieval and Renaissance Pistoia* (n. 75), pp. 128-30; Earl Hamilton, *Money, Prices, and Wages in Valencia, Aragon, and Navarre, 1351 - 1500* (Cambridge, Mass., 1936), Appendices.

[105] The sources of the mint data used in these tables, for England and the Low Countries, may be found in: John Munro, *Wool, Cloth and Gold: The Struggle for Bullion in Anglo-Burgundian Trade, ca. 1340-1478* (Brussels, 1973); John Munro, 'Mint Outputs, Money, and Prices in Late-Medieval England and the Low Countries,' in Eddy Van Cauwenberghe and Franz Irsigler, eds., *Münzprägung, Geldumlauf und Wechselkurse/ Minting, Monetary Circulation and Exchange Rates,* Trierer Historische Forschungen, 7: *Akten des 8th International Economic History Congress, Section C-7, Budapest 1982* (Trier, 1984), pp. 31-122; John Munro, 'Mint Policies, Ratios, and Outputs in England and the Low Countries, 1335-1420: Some Reflections on New Data,' *The Numismatic Chronicle*, 141 (1981), 71-116; John Munro, 'Monnayage, monnaies de compte, et mutations monétaires au Brabant à la fin du moyen âge,' in John Day, ed., *Études d'histoire monétaire, XIIe - XIXe siècles*, Études de l'Université de Paris VII et du Centre National des Lettres (Lille, 1984), pp. 263-94; Munro, 'Bullion Flows and Monetary Contraction (n. 79)', pp. 97-158; Munro, *Bullion Flows and Monetary Policies in England* (n. 80); Christopher Challis, 'Lord Hastings to the Great

expansionary war-induced fiscal and monetary policies, and especially, in the Low Countries, by severe coinage debasements, the longer periods of deflation are much more difficult to explain. Complicating any such analysis is the now large, contradictory, and often confusing literature on the so-called 'Bullion Famines' of this era, from the 1370s to the 1470s.

The most favoured theories advanced by proponents of the 'bullion famine' thesis are the following: (1) a severe worsening of the late-medieval mining slump, so that even the opening of some new mines in Serbia and Sardinia failed to compensate for the sharp decline in outputs elsewhere, and indeed a veritable cessation of silver mining in some regions; (2) a steadily worsening of balance-of-payments deficit with Asia, with consequent bullion outflows via the Levant and the eastern Baltic; and also (3) a severe diminution, though not a complete cessation, in European gold imports from the Italian trade with North Africa.

Nevertheless, if Ashtor has provided some impressive evidence for Venice's large silver exports to the Levant in the later fifteenth century, there is no concrete evidence to show that an overall European balance-of-payments deficit had been worsening from a full century earlier.[106] Indeed, a major factor that helped to end the so-called 'bullion famine' era was the Central European silver-copper mining-boom, which began during the very nadir of deflation in the 1460s, when the consequently high value of silver induced a veritable revolution in mining technology (in chemical and civil engineering). That boom augmented European silver production by over five-fold by the 1530s; and without such large increases in its silver stocks, Venice would never have been able to conduct such an increased volume and value of trade with the

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Silver Recoinage, 1464 - 1699,' in Christopher Challis, ed., *A New History of the Royal Mint*, (Cambridge, 1992), pp. 83-178, 179-397; and 'Appendix 1: Mint Output, 1220-1985,' pp. 673-698; G.C. Brooke and E. Stokes, 'Tables of Bullion Coined from 1337 to 1550,' *The Numismatic Chronicle*, 5th ser., 9 (1929), 27-69. See Figures 23-34 in http://www.economics.utoronto.ca/munro5/RWCharts3.pdf

[106] Eliyahu Ashtor, *Les métaux précieux et la balance des payements du Proche-Orient à la basse époque* (Paris, 1971); Eliyahu Ashtor, *A Social and Economic History of the Near East in the Middle Ages* (London, 1976), pp. 319-31. See also John Day, 'The Great Bullion Famine of the Fifteenth Century', *Past and Present*, no. 79 (May 1978), 1-54; reprinted in John Day, *The Medieval Market Economy* (Oxford, 1987), pp. 1-54; Munro, 'Bullion Flows and Monetary Contraction (n. 80)', pp. 97-158; and the next note.

Levant in the 1490s.[107] Furthermore, the fact that even before that mining boom had commenced, mints in England, France, and the Low Countries had all succeeded in reviving, if not in fully recovering former levels of coinage outputs, in the 1420s and early 1430s, suggests that there was no downward linear trend that would indicate a general drainage of European bullion to the 'East'. Thus additional, if not alternative, explanations for periodic bullion scarcities should be sought for this era.

Such an explanation may be found in examining the behaviour of bullion flows rather than of monetary stocks: specifically, in two sets of adverse changes in the income velocity of money, or in the demand for idle cash balances, that may be related to the pernicious effects of warfare and plagues, from the 1370s. First, the now chronic and even more devastating warfare throughout so much of Europe, combined with drastic depopulations, produced severe dislocations to established patterns of international trade, while sharply raising transaction costs in that commerce, thus even more reducing flows of both commodities and bullion. Worse, responses to the ancillary manifestations of that warfare, in terms of commercial blockades, confiscations, and especially coinage debasements, radically reduced bullion flows even more. In particular, most west European rulers, in defending themselves against aggressive debasements by their neighbours, necessarily banned the domestic circulation of most foreign coins, especially silver coins (all the more subject to surreptitious debasements); and such bans also demanded that all or most foreign coin be surrendered as bullion to their own mints. More important, in seeking to attract more bullion to their own mints, to increase coinage outputs and their seigniorage revenues, virtually all rulers banned its export. Even

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[107] The technological revolutions involved: (1) chemical engineering: the *Seigerprozess* in smelting argentiferous-cupric ores with lead to separate the two metals; and (2) mechanical engineering: adits and mechanical pumps to permit much deeper, well drained mining shafts. See Munro, 'The Central European Mining Boom (n. 20), pp. 119 - 83; John Munro, 'The Monetary Origins of the 'Price Revolution' Before the Influx of Spanish-American Treasure: The South German Silver-Copper Trades, Merchant-Banking, and Venetian Commerce, 1470-1540', in Dennis Flynn, ed., *Monetary History in Global Perspective, 1500 - 1808*, Variorum Series: *An Expanding World: The European Impact on World History, 1450 - 1800* (London: Ashgate Publishing), forthcoming; John Nef, 'Silver Production in Central Europe, 1450-1618', *Journal of Political Economy*, 49 (1941), 575-91; Nef, 'Mining and Metallurgy in Medieval Civilisation (n. 78),' pp. 691-761; Braunstein, 'Innovations in Mining and Metal Production in Europe (n. 79)', pp. 573-91; Ekkehard Westermann, 'Die Bedeutung des Thüringer Saigerhandels für den mitteleuropäischen Handel an der Wende vom 15. zum 16. Jahrhundert,' *Jahrbuch für die Geschichte Mittel- und Ostdeutschlands*, 21 (1972), 68-92. See n. 78.

when enforcement of those bans failed to prevent international exchanges of precious metals, they still depressed monetary and trade flows by raising transaction costs.

Finally, the noxious combination of such warfare, famines, plagues, the imposition of higher taxes and such monetary policies, defensive or aggressive, and the consequent commercial disruptions led to periodic but often severe economic depressions, certainly commencing by the late 1370s and 1380s. Such conditions also bred a more general climate of insecurity and pessimism that further discouraged spending and investment, increased hoarding, and further aggravated those depressions. Thus, by the 1370s, that post-Plague social climate of hedonistic spending-sprees had given way to much more pervasively gloomy and pessimistic outlooks amongst the populace in general, one that increased their demand for idle cash-balances, i.e. elevated their tendency to hoard.[108] While fourteenth-century England has provided an unusual number of extant coin hoards, their survival may be accidental and their evidence is inconclusive.[109] Better evidence

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[108] Cf. Spufford, *Money and Its Use* (n.79), p. 347: many contemporary European observers believed that 'thesaurisation [hoarding, the accumulation of plate] was the main cause of the bullion famines' during the later 14th and early 15th centuries; and also, pp. 346-47, who goes on to say: 'In retrospect it appears that it was itself in part a response to the famine. Nevertheless it made that shortage worse, although the export of precious metals from Europe now seems more important, combined with the failures of the mines to make good the losses. But whether or not contemporaries were right in the analysis of its causes, the fact of a bullion famine, not only of silver, but also of gold, was clear for all to see at the end of the fourteenth century. In the middle of the fifteenth century, it was yet worse'.

[109] See J.D.A. Thompson, *Inventory of British Coin Hoards, A.D. 600 - 1500*, Royal Numismatic Society Publications (Oxford, 1956), pp. xxxvi -xlix and p. 163. He states that 'the reigns of the three Edwards [1272-1377] are, with the exception of the Civil Wars of Charles I, the most prolific in coin-finds since the Romano-British era. This is due primarily to a period of continual unrest and bad economic conditions which encouraged an abnormal amount of hoarding.' But elsewhere (p. xvi) he more cogently argued that 'the accepted view that the majority of coin-hoards were deposited either for safety in war-time or from fear in economic crises is not a safe assumption'. Many of the 14th-century hoards are related to the continuing Scottish wars. Of the 394 coin hoards in the British Isles from c.600 to 1500, 85 can be dated to the reigns of Edward II, Edward III, and Richard II (1307-1399), with 14 in the period 1377-99. Dr. Allen Martin has produced an updated list of 14th-century English hoards: 36 for 1330-51 (and another 40 in Scotland); 16 for 1351-1412; and only 12 for 1412-1464 ('The Durham Mint: The Control, Organization, Profits, and Output of an Ecclesiastical Mint', PhD dissertation, University of Durham, 1999). If the absolute number of extant hoards declines in the very late 14th and early 15th century, the sharp declines in population and coinage outputs were far greater (thus reducing the likely incidence of hoards). Such coin hoard evidence would therefore provide better evidence for the deflation of c. 1327-43, weaker evidence for the deflation of 1377-1410, and virtually none for the deflation era of c.1440-1470. Yet the survival of specific hoards may be accidental; and money hoarded in one period was undoubtedly dishoarded and spend in some ensuing period (thus eliminating the evidence of the hoard). For the Low Countries, see Peter Spufford,

of late-medieval hoarding, especially following the Black Death, can be found in the greatly increased use of gold and silver ornamentation in the form of plate, jewellery, brocaded textiles, belt buckles, wall hangings, and furniture. Such luxurious and often very ostentatious artistic display provided not only aesthetic satisfaction but, for many a more important consideation, a feasible means of storing precious metals that could readily be restored to coinage, when so needed.[110]

Hoarding is obviously a self-justifying deflationary phenomenon; for, as prices fell from all combined circumstances of monetary contraction, the rational response of the money-holding populace would have been to save rather than to spend in the present, in anticipation of even lower prices in the future. Furthermore, the general forces of more gentle, less disruptive population decline, with smaller communities and smaller families, may also have acted to curb the income-velocity of money, i.e. to increase the relative demand for real cash balances.

Finally, for England itself one may cite a particularly significant monetary change: the fact that the overwhelming bulk of the coinage, sometimes as much as 95 percent by value, was struck in gold rather than silver – and gold coinages are necessarily undertaken at the expense of silver.[111] For if the smallest

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Monetary Problems and Policies in the Burgundian Netherlands, 1433-1496 (Leiden, 1970), pp. 55-73; and Appendix D: Coin Hoards, 1425-40, pp. 203-13.

[110] See Miskimin, *Economy of Early Renaissance Europe* (n. 103), pp. 92-104; 134-44; Johan Huizinga, *The Waning of the Middle Ages* (London, 1926), pp. 140-52; Françoise Piponnier, *Costume et vie sociale: la cour d'Anjou, XIVe-XVe siècle* (Paris, 1970), chap. 7-10; Agnes Geijer, *A History of Textile Art* (London, 1979), pp. 141-55; Susan M. Stuard, 'Gravitas and Consumption', in Jacqueline Murray, ed., *Conflicted Identities and Multiple Masculinities: Men in the Medieval West*, Garland Medieval Casebooks vol. 25 (New York, 1999), pp. 215-42; Lopez, 'Hard Times (n. 103)', pp. 19-32. In or about 1500, a Venetian visitor wrote a memoir about England, in which he stated, with some considerable wonder, that 'there is no small innkeeper, however poor and humble he may be, who does not serve with silver dishes and drinking cups; and no one, who has not in his house silver plate to the amount of at least £100 sterling, . .. is considered by the English to be a person of any consequence'. Charlotte A. Sneyd, ed., *A Relation or Rather a True Account of the Island of England with Sundry Particulars of the Customs of These People, and of the Royal Revenues Under King Henry the Seventh, about the Year 1500*, Camden Society Publications, Old Series, vol. 37 (London, 1847), pp. 28-29.

[111] See Mayhew, 'Population, Money Supply, and Velocity (n. 84)', pp. 238-57; and the mint-data sources cited above in n. 105. From 1361-65 to 1416-20, gold accounted for 85% to 98%, and usually in the 95%-98% range, of the total value of the Tower Mint's coinage outputs. Thereafter the proportion fell because the Low Countries's mints adopted a bimetallic ratio even more favourable to gold, until the 1470s,

circulating gold coin, the quarter-noble, worth 20d or 20 current silver pence could purchase 20 gallons of ale or loaves of bread, one can readily imagine that its velocity in circulation would be very low, compared to that of a silver pence or halfpence.

The question of late-medieval credit and the effective money supply

Nevertheless, according to many historians, a supposed growth in the use of credit during the later Middle Ages should have fully offset or counteracted those deflationary forces: particularly through the agency of deposit-and-transfer banking and bills-of-exchange banking. Yet neither was an innovation in this era, and both saw their most rapid initial diffusion in the last half-century of the receding Commercial Revolution era (c.1180-c.1320). The reasons why credit instruments largely failed to provide a sufficient remedy for period monetary contractions in late-medieval Europe are very complex, but may be briefly summarized here.

First, late-medieval Europe experienced very few additional innovations; and most credit instruments were still far from being effective substitutes for coined money, with the possible though still dubious exceptions to be found in a few West-European towns whose commerce was dominated by Italian merchant-bankers. Second, much more widespread and more powerful forces, economic and political, involving increased hostility from both Church and state, seriously impeded the employment or circulation of credit, with a multitude of examples to be cited in England, France, the Low Countries, and many Hanse towns, if not so much in Italy itself. Indeed, in both England and the Low Countries, late-medieval nationalist monetary policies effectively prevented the emergence of deposit-banking in the former, and virtually closed down such banks in the latter, following the Burgundian unification of the Low Countries, in a series of ever more severe ordinances (1433-34, 1467, 1480, and 1489). Furthermore, various Burgundian ordinances, both

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when the Burgundian government reverted to a more pro-silver ratio, one that attracted more and more South German silver to Antwerp. In the English mints, after 1470, gold resumed a more predominant role in the coinage, accounting for 71% to 88% of total mint outputs by value.

ducal and municipal, also sought to restrict pawnbroking (1442, 1451, 1457, 1473, 1477).[112]

Third, because of those increasingly hostile attitudes from state-dominated legal institutions, despite the growth of a more independent and international Law-Merchant, the enforcement of debt repayments, especially those involving (non-notarized) holograph documents, became even more costly and ineffective, thus restricting credit instruments to a small circle of merchants, chiefly Italian, who knew and trusted each other. Fourth, most European states and principalities, even in Italy, had failed to provide the legal institutions and sanctions for true negotiability -- i.e. the conversion of a debt instrument into cash or goods, or to be used in place of cash: the fundamentally necessary condition to permit credit instruments effectively to augment the money supply.[113] Fifth, consequently and in sum, credit instruments were far from being divorced from the use of coined money; and, in general, as Spufford, Nightingale, Mayhew, Spooner, Mueller and so many others have effectively demonstrated, credit either expanded or contracted with the coined money supply in the late-medieval and early-modern economies, usually in a non-proportional fashion.[114]

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[112] See John Munro, 'Patterns of Trade, Money, and Credit,' in James Tracy, Thomas Brady Jr., and Heiko Oberman, eds., *Handbook of European History in the Later Middle Ages, Renaissance and Reformation, 1400 - 1600*, Vol. I: *Structures and Assertions* (Leiden, 1994), pp. 147-95; John Munro, 'Bullionism and the Bill of Exchange in England, 1272-1663: A Study in Monetary Management and Popular Prejudice', in Center for Medieval and Renaissance Studies UCLA, ed., *The Dawn of Modern Banking* (New Haven and London, 1979), pp. 194-96, 204-208; reprinted in Munro, *Bullion Flows* (n. 80); John Munro, 'English "Backwardness" and Financial Innovations in Commerce with the Low Countries, 14th to 16th centuries,' in Peter Stabel, Bruno Blondé, and Anke Greve, eds., *International Trade in the Low Countries (14th - 16th Centuries): Merchants, Organisation, Infrastructure*, Studies in Urban, Social, Economic, and Political History of the Medieval and Early Modern Low Countries, no. 10 (Leuven-Apeldoorn, 2000), pp. 105-67; Raymond De Roover, *Money, Banking and Credit in Mediaeval Bruges: Italian Merchant-Bankers, Lombards, and Money Changers: A Study in the Origins of Banking* (Cambridge, Mass., 1948), pp. 130, 236-46, 331-57, esp. pp. 339-42; Herman Van der Wee, 'Monetary, Credit, and Banking Systems', in E.E. Rich and C.H. Wilson, eds., *Cambridge Economic History of Europe*, vol. V: *The Economic Organization of Early Modern Europe* (Cambridge, 1977), pp. 302, 312, 323-24 (noting similar problems in 15th-century Italy), 361-62; Van der Wee, *Antwerp Market* (n. 6), vol. II, pp. 85-86, 333-40, 355-58; and sources in n. 114.

[113] See sources in nn. 110, 112; and essays in Munro, *Textiles, Towns, and Trade* (n. 24).

[114] Pamela Nightingale, 'Monetary Contraction and Mercantile Credit in Later Medieval England,' *Economic History Review*, 2nd ser. 43 (November 1990), 560 - 75; Frank Spooner, *The International Economy and Monetary Movements in France, 1493-1725* (Cambridge, Mass., 1972), pp. 3, 53-71 (noting

The late-medieval deflations, wage stickiness, and the course of real wages: England, 1376 - 1470

With the onset of this general and very widespread deflation (evident also in late fourteenth-century Tuscany),[115] wage stickiness now assumed a significance never before revealed in European economic history. For in England, at least, unlike its experience in the second quarter of the fourteenth-century, most money wages did not decline. William Beveridge himself was the first to call attention to this phenomenon, commenting that 'from 1290 to 1379, money wages and the price of wheat move decade by decade always in the same direction, rising and falling together; thereafter they part company completely.' To explain this striking dichotomy, he argued that the socio-economic consequences of the Black Death and subsequent plagues were to transform money wages from their original institution 'as a substitute either for customary service or for allowances in kind', both tied to living costs, into true payments determined by the actual labour market.[116] The previously noted fall in the proportion of the wage typically paid in kind, from about one-half before the Black Death to one third thereafter, lends some credence to Beveridge's thesis.

The iconoclastic and brilliant Anthony Bridbury, however, came to a strikingly different conclusion in his now classic 1973 article on the Black Death: namely, that the initial mortality from that disaster 'was quite incapable of altering the social and economic relationships because so much of the population was surplus by the fourteenth century'; that the Plague was 'more purgative than toxic'; and that cumulative depopulation did not succeed in fundamentally altering the land:labour ratio to raise labour productivity and

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on p. 54 that, in the 16th century, the failure of the bullion fleets to reach Seville on schedule often led to financial crises and severe credit contractions); Spufford, *Money and Its Use* (n. 79), pp. 346-48; Reinhold Mueller, ' "Chome l'ucciello di passegio": la demande saisonnière des espèces et le marché des changes à Venise au moyen âge', in John Day, ed., *Études d'histoire monétaire, XIIe-XIXe siècles* (Université de Paris VII, Lille, 1984), pp. 195-220; Mayhew, 'Money and Prices (n. 84)', p. 121: '..credit – in the sense of cash advances – followed the behaviour of the money supply. Lending does not contract in times of a glut of coin or expand in times of scarcity. Thus credit reflected the supply of coin rather than compensated for it'.

[115] Herlihy, *Medieval and Renaissance Pistoia* (n. 75), pp. 125-30.

[116] Beveridge, 'Wages in the Winchester Manors (n. 29)', p. 31; Beveridge, 'Westminster Wages in the Manorial Era (n. 29)', pp. 18-35.

thus real wages until the later 1370s.[117] Though his arguments should not be dismissed out of hand, they are not really supported by the wage and price evidence, nor by economic theory and logic.[118]

In fact, what one now witnesses, from the late 1370s, is the nominal and real-wage pattern that will prevail, certainly in Western Europe, for the next six centuries. Many of the arguments that follow could just as well pertain to the so-called 'Great Depression' era of severe deflation and rapidly rising real wages from 1873 to 1896.

Thus in England, with a few exceptions to be noted later, real wages began their pronounced, steady, inexorable rise into the early and mid-fifteenth century essentially because of downward wage stickiness and prolonged general deflation, even if with some temporary and minor dips in the early 1380s, late 1390s, and later 1430s. Indeed, for the early fifteenth-century there really is no clearly discernible real wage trend to be observed, not from after the 1420s; and the aforementioned peak in the mid-1470s is really an anomaly.

Yet it would be wrong to rule *real* factors entirely out of court; and one may justifiably postulate that the Classical theory does retain some merit. Possibly the high real wages recorded in England during the mid-fifteenth century, during these prolonged conditions of both deflation and wage stickiness, were 'justified', in 'clearing labour markets', so to speak, if there had been some accompanying rise in the *marginal revenue product* of the artisans enjoying such high wages. How in particular are we to explain the undoubtedly widespread rise in nominal wages during the second and third decades of the fifteenth century, despite generally prevailing low prices, thus further increasing the real wages, without some productivity increases?

Deflation, wage stickiness & the course of real wages: the case of the Flemish fullers, 1370 - 1430

The same situation may also be found to a lesser extent in the southern Low Countries (Flanders and

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[117] Anthony Bridbury, 'The Black Death', *Economic History Review*, 2nd ser., 26 (1973), 582, 591-92.

[118] Bridbury's thesis rests upon the assumption that England was so overpopulated before the Black Death that the entire agrarian economy suffered from massive 'disguised unemployment'. Not only is that thesis untenable but it is contradicted by the arguments and evidence posed in his subsequent article: A. R. Bridbury, 'Before the Black Death,' *Economic History Review*, 2nd ser., 30 (1977), 393-410.

Brabant) during the early to mid-fifteenth-century, though with some added and very interesting complications. In Flanders, as Tables 4, 8, and 9 clearly indicate, the steep decline in coinage outputs and fall in the price-level had commenced about a decade after such phenomena had become apparent in England, from the very late 1380s. Despite a recoinage, with full-scale monetary reform in the early 1390s, coin outputs fell throughout that decade, ending in 1402 with a complete closure of the mints, which remained virtually dormant until 1416. At the same time, Flanders's composite price level (1451-75=100) fell from a peak of 133.8 in 1387 to just to just 83.5 in 1405, a fall of 37.6 percent. Aggravating though by no means solely responsible for this very steep deflation was Duke Philip the Bold's dramatic monetary reform of 1389-90, a *renforcement* that strengthened the silver coinage by 31.6 percent, while also altering the mint ratio sharply in favour of that metal (from 10.41:1 to 9.68:1, and thus reducing the value of the Flemish gold noble from 102d to 72d *groot*).[119] To accommodate these changes, and in particular to compensate those merchants, textile industrialists, and financiers who had depended upon payments in gold, now reduced in relative value, the ducal government and many of the town governments stipulated a proportional reduction in wages and some other money-of-account payments: a wage reduction inversely proportional to the silver *renforcement* of 31.6 percent would have been exactly 24.0 percent.[120] At Bruges, the daily money-wages of master masons, carpenters, and other building craftsmen, which had risen during the inflationary 1380s, though not by as much as the extent of general inflation, were abruptly and arbitrarily cut by 25 percent: from 12d to 9d *groot*, in early 1390, as were those of their journeymen, from 6d to 4d

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[119] Munro, *Wool, Cloth, and Gold* (n. 104), pp. 43-74; appendices, pp. 187-214; the one exception was the not very successful new coinage of 1409. See also the studies in Munro, *Bullion Flows and Monetary Policies* (n. 79).

[120] By the monetary formula for a renforcement, which involves reciprocal changes: $[1/(1 + x)] - 1$, where x = the *percentage* change in the silver content of the groot (gros). Thus $[1/(1.316) - 1] = 0.760 - 1 = -0.240$ or 24.0 percent, and quite mathematically exact. See John Munro, 'Deflation and the Petty Coinage Problem in the Late-Medieval Economy: The Case of Flanders, 1334 - 1484,' *Explorations in Economic History*, 25 (October 1988), 387-423; reprinted in Munro, *Bullion Flows and Monetary Policies* (n. 79). See n. 122 below.

12 mites (4.5d).[121] According to some contemporary reports, such wage reductions did produce riots and considerable social unrest in Bruges and other Flemish cities.[122]

In retrospect, civil disturbances in Flanders were rather less pronounced than might have been expected. But presumably only the guild artisans, a minority, were in position to voice strong objections; and evidently many, if not all of them, grudgingly accepted the argument that their new wages, while nominally lower, were being paid in *strong* rather than *weak* money.[123] Quite evidently wage reductions were imposed much more easily under conditions of a publicly promulgated coinage *renforcement*, when the public could readily perceive the physical differences between the new and old coinages, than under deflationary conditions without any such coinage changes.[124]

Nevertheless the various attempts by Flemish weaver-drapers to impose similar wage cuts during the early 1390s did produce some labour strife in the Flemish cloth industry. Only the fullers, however, have left us any concrete records of concerted opposition, and only in three drapery towns: Kortrijk, Wervik, and

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[121] Stadsarchief Brugge, Stadsrekeningen 1388/89 to 1399/1400: wage payments for building craftsmen in the 'werken' accounts.

[122] In Louis Gilliodts-van Severen, ed., *Inventaire des archives de la ville de Bruges*, 6 vols. (Bruges, 1871-78), vol. III, no. 706, pp. 134-5, 140-2 (January 1390). See also Hans Van Werveke, 'De economische en sociale gevolgen van de muntpolitiek der graven van Vlaanderen (1337-1433)', *Annales de la Société d'Emulation de Bruges*, 74 (1931), 1-15; Hans Van Werveke, 'De Vlaamse munthervorming van 1389-90', *Nederlandsche historiebladen*, 1:3 (1938), pp. 336-47; both reprinted in Hans Van Werveke, *Miscellanea Mediaevalia: Verspreide opstellen over economische en sociale geschiedenis van de middeleeuwen* (Ghent, 1968), pp. 243-54, 268-80; De Roover, *Money, Banking and Credit in Mediaeval Bruges* (n. 110), pp. 227-29; Van der Wee, *Antwerp Market* (n. 6), Vol. II, pp. 14-18, 29-30.

[123] In 1383, during the Artevelde revolt (1379-85) and just before the initial, abortive *renforcement* of 1384, the daily wages of Bruges master craftsmen in the building trades had been reduced even more sharply, from 12d to 8d *groot*, but were raised to 9.33d in 1386 and then fully restored to 12d in 1387. In 1386, just after the suppression of the Artevelde revolt, the daily wages of Bruges policemen had been raised from 6d to 7.67d (7d 16 mites) *groot*, but were set back to 6d in 1387. Note again that the policemen's daily wages were paid for a 365-day year. Data extracted from the Bruges municipal accounts: Stadsarchief Brugge, Stadsrekeningen 1382/83 to 1397/98. Unfortunately the Ghent wage accounts are far too sparse to permit similar comparisons, and Ypres' *stadsrekeningen* now survive only from 1406 in the second copy deposited at the Lille Chambre des Comptes (now in the AGR). For Bruges policemen, see below.

[124] For some evidence on nominal-wage reductions during this same deflationary era (c.1380-c.1430), and on the difficulties in interpreting the published evidence, see nn. 139-140 below.

Ghent. That opposition of course depended upon the relative strength of their *ambachten* or guilds. The weakest were evidently the Ghent fullers, who, in 1361, had lost both their representation in the town government and the right to select their own leaders.[125] Evidently they accepted, without much struggle, a quite brutal 29 percent reduction in their combined money-wage, with the 1390 monetary reform: from 45d to 32d *groot,* for a master and two journeymen, in fulling a *maerclaken* broadcloth in three days.[126] What makes their situation even more pitiful is that, unlike the building craftsmen in Bruges, they had not had an increase in money-wages since 1373;[127] and since the inflationary conditions of the 1380s still prevailed in

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[125] See in particular, Victor Fris, 'Les origines de la réforme constitutionelle de Gand de 1360-1369', *Annales du XXe congrès de la fédération archéologique et historique de la Belgique*, 3 (1907), 421 - 59; David Nicholas, *The Metamorphosis of a Medieval City: Ghent in the Age of the Arteveldes, 1302 - 1390* (Lincoln and London, 1987); David Nicholas, *The Van Arteveldes of Ghent: The Varieties of Vendetta and the Hero in History* (Ithaca, 1988); David Nicholas, *Medieval Flanders* (London, 1992), pp. 273-323 ; and Marc Boone and Hanno Brand, 'Vollersproeren en collectieve actie in Gent en Leiden in de 14e en 15e eeuw,' *Tijdschrift voor sociale geschiedenis*, 19:2 (May 1993), 168-92; Marc Boone, Hanno Brand, and Walter Prevenier, 'Revendications salariales et conjoncture économique: les salaires de foulons à Gand et à Leyde au XVe siècle,' in Erik Aerts, Brigitte Henau, Paul Janssens, and Raymond Van Uytven, eds., *Studia Historica Oeconomica: Liber Amicorum Herman Van der Wee* (Leuven, 1993), pp. 59-74; John Munro, 'Industrial Entrepreneurship in the Late-Medieval Low Countries (n. 36) ', pp. 377-88.

[126] Rates deduced from texts in Espinas and Pirenne, *Recueil de documents* (n. 49), vol. II, no. 492, pp. 535-37; Algemeen Rijksarchief, Trésor de Flandre, Series I, no. 2208; and especially Rijksarchief van Oost Vlaanderen te Gent, Oostenrijks Fonds, layette 2 (for 2 May 1423): 'desquelz [desdiz foulons] ils n'avoient et ne leur en vouloit en baillier que trente deux gros ... et est salaire trop petit...' See also Van Werveke, 'De economische en sociale gevolgen (n. 122)', pp. 4-14; Nicholas *Metamorphosis of a Medieval City* (n. 125) p. 130; and the following note. Fullers's wage data for other Flemish and Dutch drapery towns indicates that, on average, each journeyman received 35% of the wage, leaving 30% for the master (who, of course, received revenues from several similarly manned fulling vats).

[127] Even though the weaver-drapers had crushed the 1373 strike, Count Louis de Male (no friend of the weavers) had then intervened and increased their wage to 45d gros. Text of 4 September 1373 in Rijksarchief Van Oost-Vlaanderen, Oostenrijks Fonds, layette 1; provisions also repeated in *Ibid*, layette 2 (2 May 1423). See also Espinas-Pirenne, *Recueil de documents* (n. 49), vol. II, no. 485, pp. 526-27 (ordinances banning strikes); no. 491, pp. 533-35 (letters of the *deken* of weavers guild submitting dispute with fullers to arbitration); no. 492, pp. 535-37: Ghent fullers seek the count's pardon (who awards a wage of 45d per *maerclaken*). We do not know the earlier wage. In January 1386, after their real wage had deteriorated by 27 percent (as measured by this Flemish price index), the fullers' peaceful request for another increase now encountered a very hostile reaction from Count Louis' successor, Duke Philip. Fully supporting the drapers, he curtly told the fullers 'to be content' with their current wage, and furthermore decreed that henceforth any foreign fullers would be free to establish fulleries within Ghent. Duke Philip also rebuffed the fullers' demands for a change in their guild constitution. Algemeen Rijksarchief, Trésor de Flandre, Series I, no. 2208; also published in J. Bartier and A. Van Nieuwenhuysen, eds., *Les ordonnances de Philippe le Hardi, de Marguerite de Mäle, et de Jean Sans Peur, 1381-1419*, Vol. I: *Les ordonnances de Philippe le*

1390, their wage-reduction to 32d *groot* meant a decline of 41.5 percent in their real wages since 1373.[128]

Somewhat more successful were the fullers in the small drapery town of Wervik, now a major leader of the younger, more aggressive, so-called *nouvelles draperies*, which were faring rather better than the traditional draperies of the *drie steden* (Ghent, Ypres, Bruges), especially in Mediterranean markets.[129] Soon after the 1390 *renforcement*, the seigneur and bailiff of Wervik's feudal seigneury decreed an immediate reduction of 27 percent in the fullers' pay: from 48d to 35d *groot* per cloth, which still left them better off than the Ghent fullers. Nevertheless, in May 1392, but rather too late, the Wervik fullers' guild, after threats of going on strike, appealed this decree to the ducal Council of Flanders. The ducal council, however, ruled 'in favour of the drapers' of Wervik and its bailiff, forcing the Wervik fullers to accept this new wage rate, which was subsequently ratified by the promulgation of the Wervik drapery *keuren* in October 1397.[130]

Of the three recorded disputes, the Kortrijk fullers, employed by a *nouvelle draperie* that rivalled Wervik's in importance, fared by far the best, perhaps because they had responded much earlier and much more vigorously in their protests. Like the Ghent fullers, they had also not received any increase in money

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Hardi et de Marguerite de Male, du 16 octobre 1381 au 31 décembre 1393, Recueil des Ordonnances des Pays Bas, première série: 1381 - 1506 (Brussels: Palais des Académies, 1965), I, no. 88, pp. 123-4. See also Marc Boone, *Gent en de Bourgondische hertogen ca. 1384 - ca. 1453: een sociaal-politieke studie van een staatsvormingsproces*, Verhandelingen van de Koninklijke Academie voor Wetenschappen, Letteren en Schone Kunsten van België, Klasse der Letteren, Jaargang 52, no. 133 (Brussels, 1990), pp. 133-34.

[128] See Table 2. In 1390, a wage of 35d groot Flemish per cloth would purchase 0.192 basket (priced at 166.55d groot), compared to 0.328 basket in 1373. Not until 1423, after renewed inflation and another strike, would the Ghent fullers obtain any further raise in their money wages.

[129] See Federigo Melis, 'La diffusione nel Mediterranea occidentale dei panni di Wervicq e delle altre citta della Lys attorna al 1400', in *Studi in onore di Amintore Fanfani*, III: *Medioevo* (Milan, 1962), pp. 219-43; John Munro, 'The Symbiosis of Towns and Textiles: Urban Institutions and the Changing Fortunes of Cloth Manufacturing in the Low Countries and England, 1270 -1570,' *The Journal of Early Modern History: Contacts, Comparisons, Contrasts*, 3:1 (February 1999), 1-74.

[130] Henri De Sagher, et al, eds., *Recueil de documents relatifs à l'histoire de l'industrie drapière en Flandre*, IIe partie: *Le sud-ouest de la Flandre depuis l'époque bourguignonne*, 3 vols. (Brussels, 1951-66), III, no. 553, pp. 445-6, 451-2; and no. 554:136, p. 468. The two journeymen were to receive 14d groot each and the master 7d, for a total of 35d per cloth in three days. The journeymen were also to receive another 1.25d groot (16d parisis) for scrubbing the cloths ('van erdene'). The Wervik *dickedinnen* broadcloth was to be 38 ells by 9.5 quarter ells on the loom, about the same size as the Ghent *dickedinnen*.

wages since 1374, despite all the intervening debasement-induced inflation.[131] When the Kortrijk weaver-drapers attempted to impose a cut in their wages, though a more modest one of 22 percent, from 41d to 32d *groot* per broadcloth (the same rate imposed at Ghent), the fullers guild appealed to Duke Philip's councillors for arbitration. In imposing the new wage of 36d *groot*, and thus a relatively minor 12 percent wage-reduction, Duke Philip's councillors split the difference between the weaver-drapers and the fullers.[132]

The real winners of this Kortrijk labour contract were surely the fullers, who, despite the 12 percent reduction in money-wages, soon found themselves much better off because of the stark deflation that quickly ensued, from the early 1390s. Presumably, the Flemish *renforcement*, which necessarily reminted the existing stock of debased silver coins into fewer stronger coins, was a factor of considerable importance in aggravating the already existing forces for deflation; and the fall in the mean Flemish price index over the 1390s was somewhat greater than the direct monetary changes from *renforcement*: i.e. 30.3 percent vs. 24.0 percent.[133] The extent of the Flemish deflation and the consequent rise in real wages can be seen in the accompanying Tables 5 and 6. Thus, by 1396-1400 the mean purchasing power of wages for the Kortrijk

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[131] Again thanks to intervention from Count Louis de Male. Algemeen Rijksarchief, Trésor de Flandre, Series I, no. 1103; partly published in Espinas-Pirenne, *Recueil de documents* (n. 49), vol. I, no. 206, pp. 668-9; and in Bartier-Van Nieuwenhuysen, *Ordonnances de Philippe le Hardi* (n. 127), vol. I, no. 253, pp. 385-6. The only previous wage datum is for a wage increase to 15d 4 mites in 1348; in 1350, that wage represented 31.35 g of silver and 0.230 unit of a basket of consumables (priced at 65.67d gros, in Table 2). The new wage of 1374, at 41d groot, represented 45.67 g silver and 0.301 basket (priced at 136.15d groot).

[132] Algemeen Rijksarchief, Trésor de Flandre, Series I, no. 1103; partly published in Espinas-Pirenne, *Recueil de documents* (n. 49), vol. I, no. 206, pp. 668-9; and in Bartier-Van Nieuwenhuysen, *Ordonnances de Philippe le Hardi* (n. 127), vol. I, no. 253, pp. 385-6: 'les diz drapiers disans que ce estoit trop grand salaire et qu'ilz devoient estre contens de xxxii [32] gros, attendu que au temps de la dicte ordonnance [1373-4, of Louis de Male] la monnoie estoit plus feble que elle n'est de present, car le franc d'or valoit pour lors xxxvii [37] gros ou environ et aujourduy il ne vault que xxxiii [33], et selonc ce que la dicte monnoie estoit plus forte le salaire des diz foulons devoit estre diminue...' (In fact the silver coinage of 1374 was stronger than that of 1390). The Flemish gold noble had been revalued to 6s 0d or 72d gros, from 8s 6d (102d).

[133] The Flemish price index used here (1451-75=100), fell from the peak of 124.9 in 1386-90, reflecting the debasements of those years, to a trough of 87.5 in 1401-05. The reduction in the silver *traite*, because of the *renforcement*, as noted before, was from £5.337 to £4.050 gros per kg; and expressed in terms of the physical change in coinage : (1.00 + 0.316)/1 - 1 = 0.7598 - 1 = -0.2401. See Tables B-1 and B-3 in Munro, 'Mint Outputs, Money, and Prices (n. 104)', pp. 96, 100.

fullers was 26 percent higher than it had been during the debasement years of 1385-88 (Table 5). In 1400, their real-wage was 45.5 percent above what they had been earning when the 1390 contract was imposed: and in fact that was the highest real wage they had so far achieved (Table 6).

In stark contrast was the plight of the hapless Ghent fullers. Having suffered a severe 29 percent cut in money wages in 1390,[134] they did not manage to regain their real wages of 1386-90 until the very nadir of the deflation, in the late 1390s; and, even so, their mean real wage for 1396-90 was still 9 percent below their 1381-85 mean (see Table 5). They would, in fact, never regain that earlier level of real income during the period covered in this study; and during the early fifteenth-century inflation, their wages suffered a further deterioration in purchasing power.

Deflation, inflation, and real wages: other urban craftsmen in Flanders and Brabant, 1370 - 1470

In Flanders, the building craftsmen of Ghent and Bruges, and the policeman in the latter town, however, fared considerably better during the very end of the fourteenth and early fifteenth centuries; though clearly the fifteenth century as a whole was from being a consistent Golden Age. Only the Bruges data are shown (Table 4), because the craftsmen's wages in Ghent and Bruges were virtually identical throughout the fifteenth century (or to the late 1470s, when the accounts cease recording daily wages for individual craftsmen); and they of course demonstrate the same relative degree of wage stickiness. The tables plot nominal and real wage indices (with the same base: 1451-75=100), and the latter as well in terms of the specific number of 'commodity baskets' that a master mason or carpenter could purchase with his estimated annual money-wage income (for 210 days). Initially, with the abrupt 25 percent cut in nominal wages with the 1390 monetary reform, from 12d to 9d *groot,* they did suffer a very brief if substantial drop in real income (from RWI 103.4 to 62.6), before the aforementioned deflation became more pronounced; and over the next decade, following the monetary reform, the mean purchasing power of those wages rose by 75.3 percent (to 110.3 in 1399), maintaining almost as high a level in the following decade (110.1 in 1411: see Table 4). Towards the end of that period, however, in 1396-7, those craftsmen had also secured a small

[134] See above, p. 000 and nn. 125-26.

increase or restoration in their nominal wages: the masters, from 9d to 10d *groot*; and journeymen, from 4½ d to 5d *groot*.[135]

The policemen of Bruges began somewhat better off than the craftsmen because their wages had not been cut in 1390 -- after all, they were expected to maintain social order with the arbitrary pay cuts. Finally, in 1398, they too suffered a reduction in their money wages, though only 16.7 percent (from 6d to 5d); but unlike the craftsmen their money-wages were never again restored (for the duration of the records, to 1476). Thus, their real wages peak, shortly after, in 1399, but remain relatively high until the eve of the Battle of Agincourt, in 1415.

Thereafter, with Burgundian involvement in the resumption of more serious warfare in northern France, and with renewed debasements in and after 1416, the real wages for craftsmen and policemen once more began to fall, and then fall sharply. By the terrible war-torn, plague-ridden, and famine-struck year of 1439, they had plummeted 58.9 percent, to an index of just 45.3 ; and despite the fact that these craftsmen had received an increase in their nominal wages, from 10d to 11d in 1432, their real wage at the end of that decade was only 72.4 percent as high as in the previously *annis horribilis,* 1390 (Table 4). So much, therefore, for the late-medieval Golden Age for craftsmen and labourers.

According to many economic historians, the ensuing three decades were an era of very severe commercial, financial, and agrarian depression for both England and southern the Low Countries. Indeed the latter also suffered from the final stages and fatal decline of their traditional luxury woollens industry.[136]

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[135] Stadsarchief Brugge, Stadsrekeningen 1384-85 to 1399/1400: from the construction *werken* accounts.

[136] See in particular: John Hatcher, 'The Great Slump of the Mid-Fifteenth Century,' in Richard Britnell and John Hatcher, eds., *Progress and Problems in Medieval England* (Cambridge, 1996), pp. 237-72; Pamela Nightingale, 'England and the European Depression of the Mid-Fifteenth Century,' *The Journal of European Economic History*, 26:3 (Winter 1997), 631-56; Van der Wee, *Antwerp Market* (n. 6), vol. II, 61-73; Munro, 'The Symbiosis of Towns and Textiles (n. 129)', pp. 1-74; John Munro, 'Anglo-Flemish Competition in the International Cloth Trade, 1340 - 1520,' in *Rencontres d'Oxford (septembre 1994): L'Angleterre et les pays bas bourguignonnes: relations et comparaisons, XVe - XVIe siècle*, ed. Jean- Marie Cauchies, *Publication du centre européen d'études bourguigonnes*, 35 (1995): 37-60; John Munro, 'Economic Depression and the Arts in the Fifteenth-Century Low Countries,' *Renaissance and Reformation*, 19 (1983), 235-50; reprinted in Munro, *Textiles, Towns, and Trade* (n. 24)'; see also Munro, *Bullion Flows*

Yet in this same period, the real wages for Flemish urban craftsmen, who had maintained their nominal wage increase (except briefly, in 1439), soared once again, by a remarkable 179.5 percent, to reach a high of 125.6 in 1464 – just before the next round of debasements. Again they did so principally because this was a period of stark deflation, and, as noted, of very low mint outputs, sometimes with only a bare trickle of coinage -- one of not the only factor that precipitated the renewal of debasements in 1466 (Tables 4, 9).

The subsequent era of war-inspired and debasement-induced inflations again brought real wages tumbling down, as Tables 4, 8, and 9 indicate; but unfortunately the Bruges and Ghent wage payment series terminate in the mid-1470s. In the mid-sized town of Aalst, to the east of Ghent, however, the daily wage rates for master masons and carpenters remains fixed at 6d *groot* per day until well into the early sixteenth century, though some senior craftsmen were earning 7d to 8d daily; but after 1510-11, more and more such craftsmen were earning these higher rates of 7d and 8d (up to the 1530s).[137] And as noted earlier, craftsmen's wage rates in the towns of neighbouring Brabant, further to the east, generally remained fixed for most of this period: in Mechelen to 1490; and in Antwerp until 1513.

The price and wage history of Brabant, following the Burgundian monetary unification and reform of 1434-35, was unsurprisingly similar to that of Flanders. Not so before then, however, as the accompanying Table 8 shows (employing the same base, 1451-75=100). With far more drastic coinage debasements in early fifteenth-century Brabant (under Dukes Antoine, Jan IV, and Philip van Sint-Pol, 1406-1430), the real wages of Antwerp's and Mechelen's master masons and carpenters plunged steeply, especially after 1410, and then over the next three decades, by over one half (from an index of 109.8 in 1410 to 51.3 in 1437, but most clearly evident in the number of commodity baskets). Thereafter, as in Flanders, their real wages soared strongly, well more than doubling, to peak at 120.0 in 1463, virtually at the same time as did the Flemish real-wage indices. As Table 8 shows, continuing the story from the 1470s to the initial

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and Monetary Policies (n. 79).

[137] Algemeen Rijksarchief België, Rekenkamer, Stadsrekeningen Aalst, registers nos. 31,412 - 31,520.

phases of the sixteenth-century Price Revolution, the Antwerp and Mechelen craftsmen's real wages plunged especially severely during the bout of the very drastic coinage debasements under Maximilian in the 1480s, recovered during the strong-money regime of the 1490s, though by no means to their former peak; and then drifted downwards over the first third of the sixteenth century. During the subsequent era of the full Price Revolution, the real-wage experience of the Brabantine craftsmen differed very markedly from their English brethren, for reasons which lie well beyond the scope of this study.[138] But, for that matter, so they did during much of the fifteenth century, which for the Brabantine and Flemish craftsmen was only briefly a Golden Age, in terms of real wages, and chiefly during a period of undisputed depression.

Fifteenth-century anomalies: wage flexibility and falling real wages in (chiefly) rural areas

Indeed, another unsurprisingly anomaly to be noted about this mid-fifteenth century not-so-golden era are the nominal wage-rates for master carpenters and thatchers in some small Flemish villages to the east of Ghent: Afsne, St. Denijs, Zaffelare, Destelbergen, and Zavergem (Table 7). Their daily summer wage rates, having risen to 10d *groot* Flemish in the 1420s (as at Bruges and Ghent), generally remaining at that level for the next three decades, then fell, from the 1450s: for Afsne thatchers, by 30 percent, to 7d *groot;* and for the others, by 20 percent, to 8d *groot.* Despite the strong deflation of this era, their real-wages, measured now in terms of Flemish commodity baskets, fell from a mean of 14.7 units in the 1440s to just 12.3 units in the 1460s. In the neighbouring village of Zavergem, the thatchers's daily money-wage fell from 10d *groot* in the early 1430s to 8d and finally to 6d in the late 1450s, an overall decline of 40 percent in the nominal rate, before partially recovering, to 8d, in the 1460s.[139] Such evidence may support Herman Van der Wee's contention that, in this mid-fifteenth century 'depression', the agricultural sector suffered the most severely.[140]

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[138] See Van der Wee in nn. 6 and 10 above.

[139] Verlinden-Scholliers, *Dokumenten* (n.6), vol. II.ii, pp. 1244-99.

[140] Van der Wee, *Antwerp Market* (n. 6), vol. II, pp. 61-73; see also Herman Van der Wee, 'Typologie des crises et changements de structures aux Pays-Bas, XVe-XVIe siècles,' *Annales: E.S.C.*, 18 (1963), 209-25.

But some evidence for nominal wage-cuts also come from urban sources. Thus, the daily wages for carpenters employed by Mechelen's *Onse Lieve Vrouw* Hospital, unlike those employed by the city, were reduced from 12d *groot* Brabant (8d *groot* Flemish) to 9d in the late 1440s, though subsequently restored, at least in part, to 8d and then 10d *groot* by the mid 1460s. Suffering the worst were the manual labourers employed by this Mechelen hospital: their nominal wages fell from the peak of 8d *groot* Brabant (5.333d *groot* Flemish) in 1444 to a low of 5d in 1457, a decline of 38 percent.[141]

Nor were such nominal wage cuts in the midst of the fifteenth-century Golden Age limited to the Low Countries. For England during this era, Mavis Mate has provided some similar evidence for rural workers in Kent and Sussex: with nominal wage-reductions up to 30 percent for mowers at Barton, Kent, in the 1440s (enduring to the 1470s); cuts of 20 percent for ploughman at Wye, in Sussex, in the 1440s; and of 20 percent for carpenters at Lullington, Sussex, in the 1450s.[142] Furthermore, even earlier, in late fourteenth-century England (1380-99), the various decennial means of wages published in the already-cited works of Beveridge, Thorold Rogers, and Steffan indicate that many rural workers then also evidently suffered some reductions in their daily wages: as much as 29.4 percent for wheat threshers in S.E. England and 26.9 percent for Westminster farm labourers. But doubts about the statistical methods used to compile these means, especially when direct comparisons are made with the actual manorial accounts, prevent one from asserting that the nominal wages for each class and grade of worker fell, or fell as much as portrayed in these decennial indices.[143]

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[141] Data for the Flemish villages and Mechelen's Onse Lieve Vrouw Hospital extracted from Verlinden-Scholliers, *Dokumenten* (n. 6), vol. II.ii, pp. 1244-99.

[142] Data communicated to me by Prof. Mavis Mate in an unpublished paper, 'Population Fluctuations in South-East England, 1400-1530', for which I am most grateful.

[143] See above pp. and nn. 8, 21, and 30. For other examples given in these published sources, especially in the Beveridge articles, for some Winchester (especially Hinderclay) and Westminster manors in the 1390s: a fall in the mean wage of threshers from 9.50d to 8.88d per three-rased quarters; and for reapers, from 17.13d to 14.96d per acre, from 1380-9 to 1390-9. From the tables presented in all these published sources, 40 wage groups can be tabulated for the years 1380-1400; and for some time in this period, the data suggest that 32 of the 40 experienced at least some nominal-wage reductions: 20 in the 1380s and 22 in the 1390s, and thus 12 over both decades. But over all the unweighted decennial means of the 40

Some conclusions on later-medieval wage stickiness and real wages

Five obvious conclusions can now be drawn: (1) the fifteenth-century was not, and was far from universally being, a Golden Age of the Labourer in even north-western Europe; (2) nominal wage stickiness was indeed very widespread, especially in the fifteenth century, but was also not universal; (3) urban craftsmen were far more likely to enjoy conditions of downward wage stickiness than were the presumably less well organized and less well protected rural and especially agricultural workers; (4) those who did enjoy the most pronounced rise in real wages from the late fourteenth-century were precisely those who did enjoy conditions of downward wage stickiness but only during eras of deflation; (5) but such eras, unfortunately, at least for many, often coincided with severe economic depressions.

The more fitting conclusion would be to return to the Keynesian view of such wage rigidity during periods of inflation, at least according to some standard Macroeconomics textbooks, namely a situation that 'results in a higher real wage and a *reduction* in the demand for labour', so that 'employment declines and so does output'; and so very often, 'a decline in demand leads to a prolonged recession'.[144] The available evidence does not permit us to ascertain whether such conditions, especially in the depression era of the mid-fifteenth century, led to increased unemployment – apart from evident unemployment in the declining Flemish and Brabantine cloth industries.[145] Some evidence, discussed above, does suggest that employment for most craftsmen, was normally discontinuous or 'discrete' in this late-medieval era; and such conditions may well have reduced the number of days in which they secured paid employment. On the other hand, as suggested either, such unemployment may have been more voluntary than involuntary, if they were satisfied

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money-wage series fell 3.6 percent overall. For reasons indicated on p. above, concerning the computation of decennial mean wage rates, this possibly dubious working-table is not being published here.

[144] Wilton-Prescott, *Macroeconomics* (n. 64), pp. 216-18; but this is referred to as a 'short-run disequilibrium in the labour market'.

[145] See the studies in Munro, *Textiles, Towns, and Trade* (n. 24); and also Munro, 'Symbiosis of Towns and Textiles (n. 127)', and other sources cited in nn. 122, 134 above.

to accept more days of leisure.[146]

One should also note that, under such deflationary conditions, the typical employer faced and still faces not only a potential rise in his real labour costs, but even more certainly a rise in the cost of borrowing capital. For the effect of such deflation is to increase *real* interest rates [nominal rate minus the inflation rate, or plus the deflation rate], all the more so, since the historical evidence rarely if ever indicates a commensurate fall in nominal interest rates. Rash, however, would be the economic historian who would contend that every deflationary period that also experienced downward wage stickiness for much of the labour force was also one of recession or depression. Two such periods in the modern era with these characteristics were the so-called 'Great Depressions' of 1873-1896 and 1929-1939. But if economic historians now doubt that such a label can justifiably be fixed to the first of these, despite some cyclical downswings, certainly the latter was a Great Depression; and many would justify that term (despite evidence of widespread unemployment) for the mid-fifteenth century era, as just noted.[147]

Interpreting real-wage trends is also fraught with other dangers. Thus, even if the amount of labour (L) was diminishing, relative to the employed stock of land and capital (whose sum is K), as evidently did occur in late-medieval Europe, and even if labour then enjoyed a rise in real wages, the European labour force may not have gained an increased share of the national income. That would have occurred only if the elasticity of substitution between L and K, as the ratio of the marginal products of land+capital and of labour (y_K/y_L) had been less than unity[148]: if: $y_K/y_L = S_{KL} < 1$

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[146] See above pp. and nn. 46-47 for the discussion of a possibly backward-bending supply curve of labour during this late-medieval era..

[147] See n. 134.

[148] The elasticity of substitution s_{KL} is the ratio of the proportional changes in the marginal products of land+capital (y_K) and labour (y_L). Conversely, if K increases relatively to L, and if the proportional increase in K/L exceeds the proportional fall in the ratio of the marginal products of land-capital and of labour – i.e. if $S_{KL} > 1$, then the share of the national income accruing to these increased factors K will also rise. For mathematical proof, see P.R.G. Layard and A.A. Walters, *Microeconomic Theory* (London-New York, 1978), pp. 63-68, 270-76 (CES Production Function). See also Henry Phelps Brown and P.E. Hart, 'The Share of Wages in National Income;' *Economic Journal*, 62 (1952), reprinted in Phelps Brown and Hopkins, *Perspective of Wages and Prices*, pp. 106-30: 'when big changes occur in money wage rates, the

Finally, a word of caution and a plea for some perspective. As important and as vexing as is the question of real-wage trends in the late-medieval economy, we must remember that real-wages, and most especially evidence on wage-rates, do not allow us to deduce levels of real income for even the lower orders of society. Penn and Dyer recently commented as well, to stress the importance of this issue, that 'at least one-third of the population of late medieval England gained all or a part of their livelihood from earning wages'.[149] This statement might be more persuasive if the word order were changed to read: 'gained part or all', or better 'part if not all' of their livelihood. Surely, those who lived strictly by money-wages alone, and who were unable to supplement their annual incomes from agricultural holdings, or from private gardens with urban dwellings, and especially by practising more than one craft, were a very small minority of late-medieval English society, if undoubtedly a rather larger proportion of Flemish society.

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accompanying changes in the share of wages [of national income] are relatively small'; and 'a main cause of the long-period change in the shae of wages has been simply the change in the relative number of wage earners'.

[149] Penn and Dyer, 'Wages and Earnings (n. 34)', p. 356, citing in particular Rodney Hilton, 'Some Social and Economic Evidence in Late-Medieval English Tax Returns', in R.H. Hilton, ed., *Class Conflict and the Crisis of Feudalism* (London, 1985), pp. 253-67.

Table 1: Official Money Wages for Building Craftsmen for the Kingdom of England and the City of London: by Parliamentary Statute or Ordinance, for the Summer and Winter Seasons, in pence sterling, 1290 - 1495

Summer Season: Easter to Michaelmas (29 September), 'without meat and drink'
Winter Season: Michaelmas to Easter, 'without meat and drink'

Year	LONDON Summer	LONDON Winter	NATIONAL Summer	NATIONAL Winter
c.1290	5d[a] 4d[b]	3d[a] 4d[b]		
1350-1	6d	5d	3d 4d[c]	[c]
1360			4d[d]	[not stated]
1362	6d	5d		
1372	6d	5d		
1378	6d	5d		
1382	6d	5d		
1444			5½d[e]	4½d[e]
1495			6d[f] 7d[g]	5d[f] 7d[g]

a. 1290: 2d daily in the summer with food in drink; 1d daily in the winter with food and drink
b. 1290: 4d daily or 1.5d with food and drink, from Michaelmas (29 September) to Martinmas (12 November), and from Candlemas (Purificatio: 2 February) to Easter
c. 1350-51: 25 Ed III stat. 2 c. 3: rates of 4d for master free-masons; 3d for other master masons and carpenters; for all, from Michaelmas 'less according to the rate and discretion of the justices'.
d. For the chief master masons and carpenters; but 3d or 2d for the others 'according as they be worth'
e. 1444-45: 23 Henry VI c. 12: 4d daily with food and drink in the summer and 3d daily with food and drink in the winter.
f. 1495: 11 Henry VII c. 22: 4d daily with food and drink.
g. 7d daily, summer and winter, for those master masons and master carpenters having charge of six or more men; and 5d daily with food and drink.

Sources*:*

Statutes of the Realm, vol. I, pp. 311-12; II, pp. 337-39, 585-87; H. T. Riley, ed., *Munimenta Gildhallae Londoniensis:* Vol. II: *Liber Custumarum* (London, 1860),vol. I, pp. 99-100; ii, pp. 541-43; H. T. Riley, ed., *Memorials of London and London Life, in the XIIIth, XIVth, and XVth Centuries: From the Archives of the City of London, A.D. 1276-1419* (London, 1868), pp. 253-55; R. R. Sharpe, ed., *Calendar of Letter-Books Preserved Among the Archives of the City of London at the Guildhall: Letter-Book G., c.A.D. 1352-1374* (London, 1905), pp. 148, 301; *Letter Book H., c.A.D. 1375-1399 (London, 1907)*, p. 184.

Table 2: Indices of Prices for a Basket of Consumables (Phelps Brown Hopkins Index) and of a Master Mason's Wages, Nominal and Real, in England, 1300-04 to 1495-99

Mean of 1450-74 = 100

Year	Farinaceous [with drink]	Meat and Dairy	Fuel and Textiles	Aggregate Price Index	Nominal Wage Index:	Real Wage Index:
	1450-74=100	1450-74=100	1450-74=100	1450-74 = 100	1450-74 = 100	1450-74=100
1300-04	105.54	93.28	57.88	**94.32**	54.03	**57.28**
1305-09	117.88	93.92	62.80	**101.62**	58.89	**57.95**
1310-14	119.90	120.66	75.60	**114.25**	65.90	**57.68**
1315-19	225.06	128.94	67.56	**164.96**	67.10	**40.68**
1320-24	156.76	122.00	104.56	**132.20**	67.19	**50.82**
1325-29	117.30	107.56	103.34	**110.89**	67.09	**60.50**
1330-34	141.80	102.34	95.08	**117.40**	67.02	**57.08**
1335-39	89.38	95.22	96.46	**93.13**	63.43	**68.10**
1340-44	92.46	86.44	84.06	**88.40**	50.18	**56.77**
1345-49	105.24	100.74	90.14	**100.24**	50.14	**50.03**
1350-54	147.08	109.76	124.94	**128.45**	56.48	**43.97**
1355-59	123.38	104.30	158.46	**125.10**	72.68	**58.09**
1360-64	163.00	122.54	140.68	**143.05**	82.89	**57.94**
1365-69	142.52	121.68	149.52	**136.15**	83.22	**61.12**
1370-74	152.26	137.46	144.20	**145.22**	82.97	**57.13**
1375-79	106.70	109.64	131.90	**112.87**	82.83	**73.39**
1380-84	113.34	103.84	117.30	**110.50**	83.22	**75.32**
1385-89	96.16	106.28	107.36	**102.21**	82.98	**81.19**
1390-94	113.04	101.62	106.18	**107.34**	82.87	**77.20**
1395-99	112.10	105.52	99.72	**106.95**	83.13	**77.73**
1400-04	129.80	104.44	100.80	**114.25**	84.15	**73.66**
1405-09	102.54	102.68	107.46	**103.59**	91.27	**88.11**
1410-14	111.56	106.88	110.36	**109.51**	98.87	**90.28**
1415-19	122.92	108.10	108.46	**113.85**	100.28	**88.08**
1420-24	104.38	90.94	103.20	**99.25**	100.18	**100.94**
1425-29	106.76	99.52	110.60	**105.37**	100.12	**95.02**
1430-34	129.66	98.16	108.08	**113.65**	99.91	**87.91**
1435-39	130.08	99.34	104.94	**113.46**	100.02	**88.16**
1440-44	97.22	105.22	104.96	**102.01**	100.05	**98.08**
1445-49	91.02	99.72	102.02	**96.69**	99.93	**103.35**
1450-54	104.00	99.16	95.68	**100.63**	100.01	**99.38**
1455-59	90.90	96.62	101.16	**95.11**	100.01	**105.16**
1460-64	100.68	97.20	99.18	**99.25**	99.95	**100.70**
1465-69	104.16	110.50	103.30	**106.16**	100.11	**94.30**

Year	Farinaceous [with drink]	Meat and Dairy	Fuel and Textiles	Aggregate Price Index	Nominal Wage Index:	Real Wage Index:
	1450-74=100	**1450-74=100**	**1450-74=100**	**1450-74 = 100**	**1450-74 = 100**	**1450-74=100**
1470-74	100.24	96.60	100.66	**98.86**	99.92	**101.08**
1475-79	89.90	76.46	101.32	**87.21**	99.93	**114.58**
1480-84	144.04	116.70	102.74	**128.85**	100.11	**77.69**
1485-89	97.64	99.14	106.22	**100.04**	99.84	**99.80**
1490-94	105.88	110.28	101.52	**105.37**	99.75	**94.67**
1495-99	92.92	98.36	99.30	**94.51**	99.88	**105.67**

Sources: E.H. Phelps Brown and Sheila V. Hopkins, 'Seven Centuries of Building Wages,' *Economica*, 22 (August 1955), and 'Seven Centuries of the Prices of Consumables Compared with Builders' Wage-Rates,' *Economica*, 23 (Nov. 1956), reprinted E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), containing additional statistical appendices not provided in the original publication.

Table 3.

Wages of Hired Day Agricultural Labourers on the Taunton Manor, 1315-1415

Manorial Wage Data from the Winchester Manors

Year Harvest	Labourers Number	Labour Days Number	Minimum Wage in d.	Maximum Wage in d.	Mean Wage Weighted in d.	PB&H CPIndex 1451-75=100	Nominal Wage Index 1451-75=100 4.0d	Real Wage Index NWI/CPI 1451-75=100
1315	4.000	36.000	1.500	1.500	**1.500**	131.86	37.500	28.438
1316						215.92		
1317						215.14		
1318						153.76		
1319	1.000	5.000	2.000	2.000	**2.000**	118.57	50.000	42.170
1320						106.16		
1321						121.05		
1322						140.53		
1323						164.80		
1324						137.03		
1325						126.45		
1326	289.000	289.000	1.000	1.000	**1.000**	124.03	25.000	20.157
1327						95.50		
1328						96.48		
1329						118.93		
1330						120.43		
1331						134.05		
1332						131.08		
1333						110.58		
1334						99.37		
1335						95.53		
1336						100.75		
1337	31.000	62.000	1.000	1.500	**1.137**	111.48	28.427	25.501
1338	73.000	82.500	1.000	1.500	**1.170**	84.55	29.242	34.586
1339						78.68		
1340	3.000	23.500	1.000	1.000	**1.000**	96.12	25.000	26.008
1341	1.000	2.500	1.500	1.500	**1.500**	85.70	37.500	43.757
1342	1.000	10.000	1.000	1.000	**1.000**	85.10	25.000	29.377
1343	2.000	6.000	1.000	1.000	**1.000**	84.28	25.000	29.665
1344	2.000	16.000	1.000	1.000	**1.000**	97.00	25.000	25.773
1345					**1.000**	98.23	25.000	25.452
1346	3.000	15.500	1.000	1.000	**1.000**	87.83	25.000	28.466

Table 3.

Wages of Hired Day Agricultural Labourers on the Taunton Manor, 1315-1415

Manorial Wage Data from the Winchester Manors

Year Harvest	Labourers Number	Labour Days Number	Minimum Wage in d.	Maximum Wage in d.	Mean Wage Weighted in d.	PB&H CPIndex 1451-75=100	Nominal Wage Index 1451-75=100 4.0d	Real Wage Index NWI/CPI 1451-75=100
1347	509.000	521.000	1.000	1.500	**1.488**	109.35	37.188	34.008
1348	1.000	5.000	1.000	1.000	**1.000**	116.25	25.000	21.505
1349	70.000	71.000	1.000	2.500	**2.458**	97.60	61.444	62.955
1350	93.000	99.000	1.108	2.000	**1.374**	102.48	34.343	33.514
1351	7.000	8.000	1.500	2.000	**1.875**	133.58	46.875	35.093
1352	4.000	2.000	2.000	2.000	**2.000**	159.62	50.000	31.323
1353	2.000	2.000	2.000	2.000	**2.000**	138.95	50.000	35.984
1354	7.000	325.500	2.000	3.000	**2.478**	116.80	61.943	53.034
1355					**2.572**	111.98	64.305	57.428
1356	3.000	15.000	2.500	3.000	**2.667**	114.43	66.667	58.262
1357	5.000	52.000	2.000	3.000	**2.077**	132.83	51.923	39.091
1358	1.000	1.500	2.000	2.000	**2.000**	139.15	50.000	35.932
1359	1.000	3.000	2.167	2.167	**2.167**	125.73	54.175	43.090
1360	1.000	0.500	2.000	2.000	**2.000**	135.18	50.000	36.989
1361	5.000	11.000	1.000	2.000	**1.727**	130.95	43.182	32.976
1362	42.000	42.000	1.000	3.000	**1.095**	153.43	27.381	17.846
1363	38.000	39.500	1.000	2.000	**1.013**	154.95	25.316	16.338
1364	18.000	18.000	1.000	1.000	**1.000**	151.23	25.000	16.532
1365	11.000	11.000	1.000	1.000	**1.000**	142.63	25.000	17.528
1366	21.000	41.000	1.000	1.000	**1.000**	121.15	25.000	20.636
1367	12.000	319.000	1.000	1.000	**1.000**	136.83	25.000	18.272
1368	43.000	92.500	1.000	3.000	**2.054**	138.90	51.351	36.970
1369	2.000	156.000	1.000	1.000	**1.000**	149.83	25.000	16.686
1370	57.000	131.000	1.000	1.000	**1.000**	183.80	25.000	13.602
1371	87.000	2653.000	1.000	1.000	**1.000**	164.20	25.000	15.225
1372	41.000	151.000	1.000	1.000	**1.000**	132.03	25.000	18.936
1373	15.000	37.000	1.000	1.000	**1.000**	130.50	25.000	19.157
1374	207.000	219.000	1.000	1.000	**1.000**	124.78	25.000	20.036
1375	44.000	78.000	1.000	1.000	**1.000**	124.80	25.000	20.032
1376	95.000	102.000	1.000	1.000	**1.000**	146.08	25.000	17.114
1377	17.000	61.000	1.000	1.000	**1.000**	111.58	25.000	22.406
1378	65.000	71.000	1.000	1.000	**1.000**	94.98	25.000	26.323

Table 3.

Wages of Hired Day Agricultural Labourers on the Taunton Manor, 1315-1415

Manorial Wage Data from the Winchester Manors

Year Harvest	Labourers Number	Labour Days Number	Minimum Wage in d.	Maximum Wage in d.	Mean Wage Weighted in d.	PB&H CPIndex 1451-75=100	Nominal Wage Index 1451-75=100 4.0d	Real Wage Index NWI/CPI 1451-75=100
1379	10.000	15.000	1.000	1.000	**1.000**	94.24	25.000	26.529
1380	8.000	70.000	1.000	1.000	**1.000**	106.23	25.000	23.535
1381					**1.000**	118.19	25.000	21.153
1382	219.000	235.000	1.000	1.000	**1.000**	111.12	25.000	22.497
1383					**1.000**	108.23	25.000	23.100
1384	227.000	305.000	1.000	1.000	**1.000**	116.20	25.000	21.515
1385	7.000	13.000	1.000	1.000	**1.000**	110.75	25.000	22.573
1386	6.000	31.000	1.000	1.000	**1.000**	104.10	25.000	24.015
1387	3.000	20.000	1.000	1.000	**1.000**	100.28	25.000	24.931
1388	126.000	142.000	1.000	1.000	**1.000**	102.45	25.000	24.402
1389	715.000	717.000	1.000	1.000	**1.000**	100.28	25.000	24.931
1390	20.000	60.000	1.000	1.000	**1.000**	105.55	25.000	23.685
1391					**1.000**	132.85	25.000	18.818
1392	7.000	17.000	1.000	1.000	**1.000**	104.40	25.000	23.946
1393	8.000	34.500	1.000	1.000	**1.000**	100.50	25.000	24.876
1394	170.000	195.000	1.000	1.000	**1.000**	100.65	25.000	24.839
1395	7.000	62.500	1.000	1.000	**1.000**	93.25	25.000	26.810
1396	28.000	71.000	1.000	1.000	**1.000**	99.18	25.000	25.208
1397					**1.000**	116.18	25.000	21.519
1398	17.000	122.500	1.000	1.000	**1.000**	121.43	25.000	20.589
1399	55.000	135.500	1.000	1.000	**1.000**	112.93	25.000	22.139
1400	38.000	131.000	1.000	1.000	**1.000**	104.48	25.000	23.929
1401	8.000	10.000	1.000	1.000	**1.000**	130.03	25.000	19.227
1402	27.000	109.000	1.000	1.000	**1.000**	127.28	25.000	19.643
1403					**1.000**	118.85	25.000	21.035
1404					**1.000**	99.33	25.000	25.170
1405	99.000	272.000	1.000	1.000	**1.000**	98.73	25.000	25.323
1406	24.000	36.000	1.000	1.000	**1.000**	99.70	25.000	25.075
1407					**1.000**	99.35	25.000	25.164
1408	275.000	337.000	1.000	1.000	**1.000**	107.23	25.000	23.315
1409	235.000	571.000	1.000	1.000	**1.000**	119.78	25.000	20.872
1410	41.000	162.000	1.000	2.000	**1.086**	130.13	27.160	20.873

Table 3.

Wages of Hired Day Agricultural Labourers on the Taunton Manor, 1315-1415

Manorial Wage Data from the Winchester Manors

Year Harvest	Labourers Number	Labour Days Number	Minimum Wage in d.	Maximum Wage in d.	Mean Wage Weighted in d.	PB&H CPIndex 1451-75=100	Nominal Wage Index 1451-75=100 4.0d	Real Wage Index NWI/CPI 1451-75=100
1411	960.000	1157.000	1.000	3.000	**1.379**	105.95	34.464	32.529
1412	12.000	28.000	1.000	2.833	**1.196**	102.83	29.911	29.089
1413	20.000	60.500	1.000	4.000	**1.070**	108.33	26.756	24.700
1414	32.000	35.000	1.000	4.500	**1.457**	108.13	36.429	33.691
1415	2.000	24.500	1.000	3.000	**1.000**	115.30	25.000	21.683

Source:

Beveridge Wage and Price History Collection, Box A.32 (Winchester Manorial Wages): Archives of the British Library of Political and Economic Science

Table 4. **Prices of and Price Indices for a Basket of Consumables, in Flanders (Bruges-Ghent) With Wages of and Wage Indices for Master Building Craftsmen in Bruges in d. groot Flemish: in quinquennial means, 1351-55 to 1496-1500**

Mean of 1451-75 = 100

Years Quinqu-ennia	Grains: Wheat, Rye Barley, Peas 57.143d groot Flemish 1451-75= 100	Butter and Cheese 44.664d groot Flem 1451-75= 100	Textiles (Low) Quality) 25.519d groot Flem 1451-75= 100	Aggregate Price Index 127.326d groot Flem 1451-75= 100	Total Value of Basket in d. groot Flemish	Wages of Master Building Craftsmen in Bruges in d gr. Mean: Major/Minor wages	Bruges Wage Index Mean Mode 11.000d 1451-75= 100	Real Wage Index (NWI/CPI) 1451-75= 100	Real Wage in Units of Commodity Baskets for 210 days wages
1351-56	68.155	63.044	39.66	60.651	77.224	5.200	47.273	77.943	14.141
1356-60	101.779	93.149	45.94	87.561	111.488	6.000	54.545	62.294	11.302
1361-65	108.244	98.240	56.95	94.454	120.264	6.850	62.273	65.929	11.961
1366-70	126.573	101.840	74.78	107.518	136.898	8.000	72.727	67.642	12.272
1371-75	121.344	112.359	107.22	115.361	146.884	8.000	72.727	63.043	11.438
1376-80	105.020	121.359	109.91	111.732	142.264	8.800	80.000	71.600	12.990
1381-85	110.256	135.707	110.80	119.294	151.892	8.800	80.000	67.061	12.167
1386-90	132.369	122.622	112.28	124.923	159.060	10.867	98.788	79.079	14.347
1391-95	82.351	99.248	83.66	88.540	112.734	9.000	81.818	92.409	16.765
1396-00	92.357	92.141	80.61	89.927	114.500	9.850	89.545	99.576	18.066
1401-05	93.309	80.696	86.73	87.566	111.494	10.000	90.909	103.818	18.835
1406-10	111.719	91.053	106.12	103.347	131.588	10.000	90.909	87.965	15.959
1411-15	94.265	92.410	103.12	95.388	121.454	10.000	90.909	95.304	17.290
1416-20	110.781	104.675	103.64	107.208	136.504	10.200	92.727	86.493	15.692
1421-25	110.274	114.401	105.98	110.862	141.156	10.200	92.727	83.642	15.175
1426-30	126.514	114.522	111.20	119.237	151.820	10.200	92.727	77.767	14.109
1431-35	135.656	115.153	116.24	124.573	158.614	10.800	98.182	78.815	14.299
1436-40	178.012	109.162	117.47	141.728	180.456	10.800	98.182	69.275	12.568
1441-45	114.330	113.071	115.33	114.088	145.264	11.000	100.000	87.651	15.902
1446-50	107.243	110.048	113.86	109.553	139.490	11.000	100.000	91.280	16.560
1451-55	94.835	102.673	109.24	100.471	127.926	11.000	100.000	99.531	18.057
1456-60	131.778	107.294	104.29	117.681	149.838	11.000	100.000	84.976	15.417
1461-65	84.626	90.731	98.16	89.479	113.930	11.000	100.000	111.758	20.276
1466-70	91.545	101.196	94.39	95.500	121.596	11.000	100.000	104.712	18.997
1471-75	97.215	98.106	93.93	96.869	123.340	11.000	100.000	103.232	18.729
1476-80	122.387	118.350	92.79	115.040	146.476				
1481-85	200.818	131.932	106.52	157.754	200.862				

Years	Grains:	Butter	Textiles	Aggregate	Total Value	Wages of	Bruges	Real Wage	Real Wage
Quinqu-ennia	Wheat, Rye Barley, Peas	and Cheese	(Low) Quality)	Price Index	of Basket	Master Building Craftsmen	Wage Index Mean Mode	Index (NWI/CPI)	in Units of Commodity
	57.143d groot Flemish 1451-75= 100	44.664d groot Flem 1451-75= 100	25.519d groot Flem 1451-75= 100	127.326d groot Flem 1451-75= 100	in d. groot Flemish	in Bruges in d gr. Mean: Major/Minor wages	11.000d 1451-75= 100	1451-75= 100	Baskets for 210 days wages
1486-90	203.856	187.117	164.40	190.077	242.018				
1491-95	176.017	122.192	157.51	153.427	195.352				
1496-00	88.210	90.631	147.79	101.000	128.599				

Sources:

Wages and cloth prices: Stadsarchief Brugge, Stadsrekeningen 1350-51 to 1499-1500; Algemeen Rijksarchief, Rekenkamer, reg. nos. 32,461-32,532; Stadsarchief Gent, Stadsrekeningen, 1350-51 to 1499-1500

Prices: Charles Verlinden, E. Scholliers, et al, eds., *Documents pour l'histoire des prix et des salaires en Flandre et en Brabant/Dokumenten voor de geschiedenis van prijzen en lonen in Vlaanderen en Brabant*, 4 vols. (Bruges, 1959 - 65), Vols. I and II; John Munro, 'Mint Outputs, Money, and Prices in Late-Medieval England and the Low Countries,' in Eddy Van Cauwenberghe and Franz Irsigler, eds., *Münzprägung, Geldumlauf und Wechselkurse/Minting, Monetary Circulation and Exchange Rates,* Trierer Historische Forschungen, 7: *Akten des 8th International Economic History Congress, Section C-7, Budapest 1982* (Trier, 1984), pp. 31-122.

Composition of the Flemish Basket of Consumables:

Commodity:	Mean Value in 1451 - 75	Weight in this Index	Weight in the Phelps-Brown Index (England)
Grains:			
45.46 litres of wheat 39.37 litres of rye 18.18 litres of barley 24.37 litres of peas 163.66 litres of barley malt			
Subtotal	57.143	44.88%	42.5%
13.61 kg of butter 13.61 kg of cheese			
Subtotal	44.664d	35.08%	37.5%
1.225 metres of coarse woollens			
Subtotal	25.519d	20.04%	20.0%
TOTAL	127.326d	100.0%	100.0%

Table 5. Fullers's Wages in Ghent (Flanders), in d. groot Flemish and in commodity baskets, 1373-1430

Year	Nominal Wage in d groot Flemish 3 days: M + 2J	Nominal Wage in d groot Flemish journeymen per day	Bruges Police-man's Daily Wage	Income for 210 days per fuller journeyman in d. groot Flemish	Income for 210 days per fuller journeyman in £ groot Flemish	Value of Commodity Basket in d. groot Flemish	Price Index 1451-75=100	No. of Commodity Baskets per annual wage
1373	45.00	5.250	5.000	1102.500	4.594	137.200	107.755	8.036
1374	45.00	5.250	5.000	1102.500	4.594	136.150	106.930	8.098
1375	45.00	5.250	5.000	1102.500	4.594	164.850	129.471	6.688
1376	45.00	5.250	5.000	1102.500	4.594	150.020	117.824	7.349
1377	45.00	5.250	5.000	1102.500	4.594	139.150	109.286	7.923
1378	45.00	5.250	5.000	1102.500	4.594	150.380	118.106	7.331
1379	45.00	5.250	5.000	1102.500	4.594	136.240	107.001	8.092
1380	45.00	5.250	6.000	1102.500	4.594	135.530	106.443	8.135
1381	45.00	5.250	6.000	1102.500	4.594	134.940	105.980	8.170
1382	45.00	5.250	6.000	1102.500	4.594	146.430	115.004	7.529
1383	45.00	5.250	6.000	1102.500	4.594	144.780	113.708	7.615
1384	45.00	5.250	6.000	1102.500	4.594	155.630	122.230	7.084
1385	45.00	5.250	6.000	1102.500	4.594	177.680	139.547	6.205
1386	45.00	5.250	6.000	1102.500	4.594	168.920	132.667	6.527
1387	45.00	5.250	6.000	1102.500	4.594	170.680	134.050	6.459
1388	45.00	5.250	6.000	1102.500	4.594	134.400	105.556	8.203
1389	45.00	5.250	6.000	1102.500	4.594	154.750	121.538	7.124
1390	32.00	3.733	6.000	784.000	3.267	166.550	130.806	4.707
1391	32.00	3.733	6.000	784.000	3.267	135.250	106.223	5.797
1392	32.00	3.733	6.000	784.000	3.267	114.550	89.966	6.844
1393	32.00	3.733	6.000	784.000	3.267	100.490	78.923	7.802
1394	32.00	3.733	6.000	784.000	3.267	111.740	87.759	7.016
1395	32.00	3.733	6.000	784.000	3.267	101.640	79.827	7.713
1396	32.00	3.733	6.000	784.000	3.267	106.760	83.848	7.344
1397	32.00	3.733	6.000	784.000	3.267	129.610	101.794	6.049
1398	32.00	3.733	5.000	784.000	3.267	118.830	93.327	6.598

Table 5. Fullers's Wages in Ghent (Flanders), in d. groot Flemish and in commodity baskets, 1373-1430

Year	Nominal Wage in d groot Flemish 3 days: M + 2J	Nominal Wage in d groot Flemish journeymen per day	Bruges Police-man's Daily Wage	Income for 210 days per fuller journeyman in d. groot Flemish	Income for 210 days per fuller journeyman in £ groot Flemish	Value of Commodity Basket in d. groot Flemish	Price Index 1451-75=100	No. of Commodity Baskets per annual wage
1399	32.00	3.733	5.000	784.000	3.267	104.950	82.426	7.470
1400	32.00	3.733	5.000	784.000	3.267	112.350	88.238	6.978
1401	32.00	3.733	5.000	784.000	3.267	112.130	88.065	6.992
1402	32.00	3.733	5.000	784.000	3.267	113.120	88.843	6.931
1403	32.00	3.733	5.000	784.000	3.267	117.020	91.906	6.700
1404	32.00	3.733	5.000	784.000	3.267	108.650	85.332	7.216
1405	32.00	3.733	5.000	784.000	3.267	106.550	83.683	7.358
1406	32.00	3.733	5.000	784.000	3.267	107.460	84.398	7.296
1407	32.00	3.733	5.000	784.000	3.267	124.880	98.079	6.278
1408	32.00	3.733	5.000	784.000	3.267	131.540	103.310	5.960
1409	32.00	3.733	5.000	784.000	3.267	159.420	125.206	4.918
1410	32.00	3.733	5.000	784.000	3.267	134.640	105.744	5.823
1411	32.00	3.733	5.000	784.000	3.267	105.090	82.536	7.460
1412	32.00	3.733	5.000	784.000	3.267	114.720	90.099	6.834
1413	32.00	3.733	5.000	784.000	3.267	126.580	99.414	6.194
1414	32.00	3.733	5.000	784.000	3.267	124.780	98.000	6.283
1415	32.00	3.733	5.000	784.000	3.267	136.100	106.891	5.760
1416	32.00	3.733	5.000	784.000	3.267	146.230	114.847	5.361
1417	32.00	3.733	5.000	784.000	3.267	164.870	129.487	4.755
1418	32.00	3.733	5.000	784.000	3.267	126.750	99.548	6.185
1419	32.00	3.733	5.000	784.000	3.267	118.840	93.335	6.597
1420	32.00	3.733	5.000	784.000	3.267	125.830	98.825	6.231
1421	32.00	3.733	5.000	784.000	3.267	132.890	104.370	5.900
1422	32.00	3.733	5.000	784.000	3.267	143.580	112.766	5.460
1423	40.00	4.667	5.000	980.000	4.083	131.180	103.027	7.471
1424	40.00	4.667	5.000	980.000	4.083	146.320	114.918	6.698

Year	Nominal Wage in d groot Flemish 3 days: M + 2J	Nominal Wage in d groot Flemish journeymen per day	Bruges Police-man's Daily Wage	Income for 210 days per fuller journeyman in d. groot Flemish	Income for 210 days per fuller journeyman in £ groot Flemish	Value of Commodity Basket in d. groot Flemish	Price Index 1451-75=100	No. of Commodity Baskets per annual wage
1425	40.00	4.667	5.000	980.000	4.083	151.810	119.229	6.455
1426	40.00	4.667	5.000	980.000	4.083	139.910	109.883	7.005
1427	40.00	4.667	5.000	980.000	4.083	148.900	116.944	6.582
1428	40.00	4.667	5.000	980.000	4.083	145.450	114.234	6.738
1429	40.00	4.667	5.000	980.000	4.083	161.100	126.526	6.083
1430	40.00	4.667	5.000	980.000	4.083	163.740	128.599	5.985

Sources: Georges Espinas and Henri Pirenne, eds., *Recueil de documents relatifs à l'histoire de l'industrie drapière en Flandre*, Ire partie: Des origines à l'époque bourguignonne, 4 vols. (Brussels, 1906-1924), II, no. 492, pp. 535-37; Algemeen Rijksarchief, Trésor de Flandre, Series I, no. 2208; and especially Rijksarchief van Oost Vlaanderen te Gent, Oostenrijks Fonds, layette 2 ; sources for tables 1-4.

Table 6. Nominal and Real Wages of Kortrijk Fullers, 1351 - 1450
Wages to Full one Broadcloth in Three Days: Master and Two Journeymen
in d. groot Flemish: in quinquennial means

Year	Fullers' Fee in d. groot Flemish	Journeymen's Pay for One Cloth in d. groot Flemish	Journeymen per day in d. groot Flemish	Income for 210 days in d. groot Flemish	Value of a Basket of Consumables in d. groot Flemish	Flemish Price Index 1451-75=100	Fuller's Annual Wage Income in Commodity Baskets (harmonic means)
1351-55	15.167	5.308	1.769	371.583	77.224	60.651	4.812
1356-60	15.167	5.308	1.769	371.583	111.488	87.561	3.333
1361-65	15.167	5.308	1.769	371.583	120.264	94.454	3.090
1366-70	15.167	5.308	1.769	371.583	136.898	107.518	2.714
1371-75	20.333	7.117	2.372	498.167	146.884	115.361	2.946
1376-80	41.000	14.350	4.783	1004.500	142.264	111.732	7.061
1381-85	41.000	14.350	4.783	1004.500	151.892	119.294	6.613
1386-90	40.000	14.000	4.667	980.000	159.060	124.923	6.137
1391-95	36.000	12.600	4.200	882.000	112.734	88.540	7.824
1396-00	36.000	12.600	4.200	882.000	114.500	89.927	7.703
1401-05	36.000	12.600	4.200	882.000	111.494	87.566	7.911
1406-10	36.000	12.600	4.200	882.000	131.588	103.347	6.703
1411-15	36.000	12.600	4.200	882.000	121.454	95.388	7.262
1416-20	38.400	13.440	4.480	940.800	136.504	107.208	6.810
1421-25	38.400	13.440	4.480	940.800	141.156	110.862	6.619
***1426-30**	39.200	13.720	4.573	960.400	151.820	119.237	6.3
****1431-35**	42.200	14.770	4.923	1033.900	158.614	124.573	6.503
1436-40	40	14.000	4.667	980.000	180.456	141.728	5.431
1441-45	40	14.000	4.667	980.000	145.264	114.088	6.746
1446-50	40.000	14.000	4.667	980.000	139.490	109.553	7.026

* In 1429, raised to 44d groot Flemish

** In Nov. 1433 cut to 36d, but raised to 39d in December, and to 40d in June 1434.

Source: Georges Espinas and Henri Pirenne, eds., *Recueil de documents relatifs à l'histoire de l'industrie drapière en Flandre*, Ire partie: Des origines à l'époque bourguignonne, 4 vols (Brussels, 1906-1924), II, no. 492, pp. 535-37; Rijksarchief van Oost Vlaanderen te Gent, Oostenrijks Fonds; Algemeen Rijksarchief, Trésor de Flandre, Series I.

Table 7a. **Daily Summer Wages in the Small Towns and Villages of Eastern Flanders, 1409 - 1470 in d. groot Flemish and annual wage income in units of the Flemish 'basket of consumables'**

Year	Flemish Basket of Consumables in d. groot Flemish	Afsne Masons wage in d. groot (daily)	Afsne Masons wage in in BC units (annual)	Afsne Carpenters wage in d. groot (daily)	Afsne Carpenters wage in in BC units (annual)	Afsne Thatchers wage in d. groot (daily)	Afsne Thatchers wage in in BC units (annual)	St. Denijs Thatchers wage in d. groot (daily)	St. Denijs Thatchers wage in in BC units (annual)
1409	159.42	9.00	11.86	10.00	13.17	8.00	10.54		
1410	134.64	9.00	14.04	10.00	15.60	8.00	12.48		
1411	105.09	9.00	17.98	10.00	19.98	8.00	15.99	8.00	15.99
1412	114.72	9.00	16.47	10.00	18.31			8.00	14.64
1413	126.58	9.00	14.93	10.00	16.59			9.00	14.93
1414	124.78	9.00	15.15	10.00	16.83	9.00	15.15	9.00	15.15
1415	136.1	9.00	13.89	10.00	15.43	9.00	13.89	9.00	13.89
1416	146.23	9.00	12.92	10.00	14.36	9.00	12.92	9.00	12.92
1417	164.87	9.00	11.46	10.00	12.74	9.00	11.46	9.00	11.46
1418	126.75	9.00	14.91	10.00	16.57			9.00	14.91
1419	118.84	9.00	15.90	10.00	17.67	8.00	14.14	9.00	15.9
1420	125.83			10.00	16.69	8.00	13.35	9.00	15.02
1421	132.89			10.00	15.80	8.00	12.64	9.00	14.22
1422	143.58			10.00	14.63	8.00	11.70	9.00	13.16
1423	131.18			10.00	16.01	8.00	12.81	9.00	14.41
1424	146.32			10.00	14.35				
1425	151.81			10.00	13.83	10.00	13.83	10.00	13.83
1426	139.91			10.00	15.01	10.00	15.01	10.00	15.01
1427	148.9			10.00	14.10	10.00	14.1	10.00	14.1
1428	145.45	12.00	17.33	10.00	14.44	10.00	14.44	10.00	14.44
1429	161.1	12.00	15.64	10.00	13.04	10.00	13.04	10.00	13.04
1430	163.74	12.00	15.39	10.00	12.83	10.00	12.83	10.00	12.83
1431	154.89	12.00	16.27	10.00	13.56	10.00	13.56	10.00	13.56
1432	154.15	10.00	13.62	10.00	13.62	10.00	13.62	10.00	13.62
1433	174.77	10.00	12.02	10.00	12.02	10.00	12.02	10.00	12.02
1434	171.03	10.00	12.28	10.00	12.28	10.00	12.28	10.00	12.28
1435	138.23	10.00	15.19	10.00	15.19	10.00	15.19	10.00	15.19
1436	122.42	10.00	17.15	10.00	17.15	10.00	17.15	10.00	17.15
1437	140.38	10.00	14.96	10.00	14.96	10.00	14.96	10.00	14.96
1438	221.9	10.00	9.46	10.00	9.46	10.00	9.46	10.00	9.46
1439	255.56	10.00	8.22	10.00	8.22	10.00	8.22	10.00	8.22

Year	Flemish Basket of Consumables in d. groot Flemish	Afsne Masons wage in d. groot (daily)	Afsne Masons wage in in BC units (annual)	Afsne Carpenters wage in d. groot (daily)	Afsne Carpenters wage in in BC units (annual)	Afsne Thatchers wage in d. groot (daily)	Afsne Thatchers wage in in BC units (annual)	St. Denijs Thatchers wage in d. groot (daily)	St. Denijs Thatchers wage in in BC units (annual)
1440	162.02	10.00	12.96	10.00	12.96	10.00	12.96	10.00	12.96
1441	158.99	10.00	13.21	10.00	13.21	10.00	13.21	10.00	13.21
1442	139.36	10.00	15.07	10.00	15.07	10.00	15.07	10.00	15.07
1443	178.33	10.00	11.78	10.00	11.78	10.00	11.78	10.00	11.78
1444	130.42	10.00	16.10	10.00	16.10	10.00	16.10	10.00	16.1
1445	119.22	10.00	17.61	10.00	17.61	10.00	17.61	10.00	17.61
1446	144.25	10.00	14.56	10.00	14.56	10.00	14.56	10.00	14.56
1447	161.01	10.00	13.04	10.00	13.04	10.00	13.04	10.00	13.04
1448	144.93	10.00	14.49	10.00	14.49	10.00	14.49	10.00	14.49
1449	118.42	10.00	17.73	10.00	17.73	10.00	17.73	10.00	17.73
1450	128.84	10.00	16.30	10.00	16.30	10.00	16.30	10.00	16.30
1451	126.94	10.00	16.54	10.00	16.54	10.00	16.54		
1452	122.05	10.00	17.21	10.00	17.21	10.00	17.21		
1453	134.40	10.00	15.63	10.00	15.63	10.00	15.63		
1454	133.87	10.00	15.69	10.00	15.69	10.00	15.69		
1455	122.37	10.00	17.16	8.00	13.73	7.00	12.01		
1456	151.34	10.00	13.88	8.00	11.10			8.00	11.1
1457	165.25			8.00	10.17				
1458	152.79			8.00	11.00				
1459	134.53								
1460	145.28					6.00	8.67		
1461	129.24			7.50	12.19				
1462	120.67			7.50	13.05				
1463	103.33			7.50	15.24				
1464	100.59								
1465	115.82					7.00	12.69		
1466	119.28	12.00	21.13	7.00	12.32	7.00	12.32		
1467	128.35			7.00	11.45	7.00	11.45	7.00	11.45
1468	120.08			7.00	12.24	7.00	12.24		
1469	122.26			7.00	12.02	7	12.02		
1470	118.01			7	12.46	7	12.46		

Table 7b: Daily Summer Wages in the Small Towns and Villages of Eastern Flanders, 1409 - 1470:

in d. groot Flemish and annual wage incomes in units of the Flemish 'basket of consumables'

Year	Flemish Basket of Consumables in d. groot Flemish	Zaffelare Thatchers wage in d. groot (daily)	Zaffelare Thatchers wage in in BC units (annual)	Destelbergen Thatchers wage in d. groot (daily)	Destelbergen Thatchers wage in in BC units (annual)	Destelbergen Masons wage in d. groot (daily)	Destelbergen Masons wage in in BC units (annual)
1409	159.42	6	7.90				
1410	134.64	6.00	9.36	8.00	12.48		
1411	105.09	6.00	11.99	8.00	15.99		
1412	114.72	6.00	10.98				
1413	126.58					10.00	16.59
1414	124.78					10.00	16.83
1415	136.10					10.00	15.43
1416	146.23					9.00	12.92
1417	164.87			9.00	11.46	9.00	11.46
1418	126.75			9.00	14.91	9.00	14.91
1419	118.84			9.00	15.90	9.00	15.9
1420	125.83	5.5	9.18	9.00	15.02		
1421	132.89	6	9.48	9.00	14.22		
1422	143.58	6	8.78	9.00	13.16		
1423	131.18	6	9.61	9.00	14.41	10.00	16.01
1424	146.32	6	8.61			10.00	14.35
1425	151.81	6	8.30			10.00	13.83
1426	139.91	6	9.01	10.00	15.01	10.00	15.01
1427	148.90	6	8.46	10.00	14.10	10.00	14.1
1428	145.45	6	8.66	10.00	14.44	10.00	14.44
1429	161.10	6	7.82	10.00	13.04	10.00	13.04
1430	163.74	7	8.98	10.00	12.83	10.00	12.83
1431	154.89	7	9.49	10.00	13.56	10.00	13.56
1432	154.15	7	9.54	10.00	13.62	10.00	13.62
1433	174.77	7	8.41	10.00	12.02		
1434	171.03	7	8.59	10.00	12.28		
1435	138.23	7	10.63	10.00	15.19		
1436	122.42	7	12.01	10.00	17.15		

Year	Flemish Basket of Consumables in d. groot Flemish	Zaffelare Thatchers wage in d. groot (daily)	Zaffelare Thatchers wage in in BC units (annual)	Destelbergen Thatchers wage in d. groot (daily)	Destelbergen Thatchers wage in in BC units (annual)	Destelbergen Masons wage in d. groot (daily)	Destelbergen Masons wage in in BC units (annual)
1437	140.38	7	10.47	10.00	14.96		
1438	221.90	7	6.62	10.00	9.46	8.00	7.57
1439	255.56			10.00	8.22		
1440	162.02			10.00	12.96		
1441	158.99	6	7.93	10.00	13.21		
1442	139.36	6	9.04	10.00	15.07		
1443	178.33	6	7.07	10.00	11.78		
1444	130.42	6	9.66	10.00	16.10		
1445	119.22	6	10.57	10.00	17.61		
1446	144.25	6	8.73	10.00	14.56	10.00	14.56
1447	161.01	6	7.83	10.00	13.04		
1448	144.93	6	8.69	10.00	14.49		
1449	118.42	5	8.87	10.00	17.73		
1450	128.84	5	8.15	10.00	16.30		
1451	126.94						
1452	122.05						
1453	134.40						
1454	133.87			8.00	12.55	8.00	12.55
1455	122.37			8.00	13.73	8.00	13.73
1456	151.34	6	8.33	8.00	11.10	8.00	11.1
1457	165.25			8.00	10.17	8.00	10.17
1458	152.79			8.00	11.00		
1459	134.53			8.00	12.49		
1460	145.28			8.00	11.56		
1461	129.24	6.5	10.56	8.00	13.00		
1462	120.67			8.00	13.92		
1463	103.33	6	12.19	8.00	16.26		
1464	100.59	6	12.53	8.00	16.70		
1465	115.82	6	10.88	8.00	14.51		
1466	119.28	6	10.56	8.00	14.08		
1467	128.35			8.00	13.09		
1468	120.08			8.00	13.99		
1469	122.26						

Year	Flemish Basket of Consumables in d. groot Flemish	Zaffelare Thatchers wage in d. groot (daily)	Zaffelare Thatchers wage in in BC units (annual)	Destelbergen Thatchers wage in d. groot (daily)	Destelbergen Thatchers wage in in BC units (annual)	Destelbergen Masons wage in d. groot (daily)	Destelbergen Masons wage in in BC units (annual)
1470	118.01			7.00	12.46		

Table 7b **Daily Summer Wages in the Small Towns and Villages of Eastern Flanders, 1409 - 1470 in d. groot Flemish and annual wage income in units of the Flemish 'basket of consumables'**

Year	Flemish Basket of Consumables in d. groot Flemish	Destelbergen Carpenters wage in d. groot (daily)	Destelbergen Carpenters wage in in BC units (annual)	Zavergem Carpenters wage in d. groot (daily)	Zavergem Carpenters wage in in BC units (annual)	Zavergem Thatchers wage in d. groot (daily)	Zavergem Thatchers wage in in BC units (annual)
1409	159.42					6.00	7.9
1410	134.64					9.00	14.04
1411	105.09					9.00	17.98
1412	114.72			6.00	10.98	9.00	16.47
1413	126.58	10.00	16.59			9.00	14.93
1414	124.78	10.00	16.83	8.00	13.46	9.00	15.15
1415	136.10	10.00	15.43			9.00	13.89
1416	146.23	9.00	12.92			9.00	12.92
1417	164.87	9.00	11.46			9.00	11.46
1418	126.75	9.00	14.91				
1419	118.84	9.00	15.90			6.00	10.6
1420	125.83			7.00	11.68	6.00	10.01
1421	132.89	8.00	12.64			6.00	9.48
1422	143.58	8.00	11.70			6.00	8.78
1423	131.18	8.00	12.81			6.00	9.61
1424	146.32					6.00	8.61
1425	151.81	10.00	13.83	6.00	8.30	6.00	8.30

Year	Flemish Basket of Consumables in d. groot Flemish	Destelbergen Carpenters wage in d. groot (daily)	Destelbergen Carpenters wage in in BC units (annual)	Zavergem Carpenters wage in d. groot (daily)	Zavergem Carpenters wage in in BC units (annual)	Zavergem Thatchers wage in d. groot (daily)	Zavergem Thatchers wage in in BC units (annual)
1426	139.91	10.00	15.01			6.00	9.01
1427	148.9	10.00	14.10			6.00	8.46
1428	145.45	10.00	14.44			6.00	8.66
1429	161.10	10.00	13.04				
1430	163.74	10.00	12.83				
1431	154.89	10.00	13.56			7.00	9.49
1432	154.15	10.00	13.62			10.00	13.62
1433	174.77	12.00	14.42			10.00	12.02
1434	171.03	10.00	12.28				
1435	138.23	10.00	15.19			8.00	12.15
1436	122.42	10.00	17.15			8.00	13.72
1437	140.38	10.00	14.96			8.00	11.97
1438	221.9	10.00	9.46			8.00	7.57
1439	255.56	10.00	8.22			8.00	6.57
1440	162.02	10.00	12.96			8.00	10.37
1441	158.99	10.00	13.21			8.00	10.57
1442	139.36	10.00	15.07			8.00	12.06
1443	178.33	10.00	11.78			8.00	9.42
1444	130.42	10.00	16.10			8.00	12.88
1445	119.22	10.00	17.61			8.00	14.09
1446	144.25	10.00	14.56			8.00	11.65
1447	161.01	10.00	13.04			8.00	10.43
1448	144.93	10.00	14.49			8.00	11.59
1449	118.42					8.00	14.19
1450	128.84					8.00	13.04
1451	126.94					8.00	13.23
1452	122.05					8.00	13.76
1453	134.40					8.00	12.50
1454	133.87					8.00	12.55
1455	122.37					8.00	13.73
1456	151.34					8.00	11.10
1457	165.25					8.00	10.17

Year	Flemish Basket of Consumables in d. groot Flemish	Destelbergen Carpenters wage in d. groot (daily)	Destelbergen Carpenters wage in in BC units (annual)	Zavergem Carpenters wage in d. groot (daily)	Zavergem Carpenters wage in in BC units (annual)	Zavergem Thatchers wage in d. groot (daily)	Zavergem Thatchers wage in in BC units (annual)
1458	152.79			10.00	13.74		
1459	134.53			8.00	12.49	6.00	9.37
1460	145.28					6.00	8.67
1461	129.24			7.00	11.37	7.00	11.37
1462	120.67			7.00	12.18	6.00	10.44
1463	103.33			7.00	14.23	6.00	12.19
1464	100.59			7.00	14.61	6.00	12.53
1465	115.82			7.00	12.69	6.00	10.88
1466	119.28			7.00	12.32	7.00	12.32
1467	128.35			7.00	11.45	8.00	13.09
1468	120.08			7.00	12.24	8.00	13.99
1469	122.26			7.00	12.02	8.00	13.74
1470	118.01			7.00	12.46	8.00	14.24

Source:

Charles Verlinden, E. Scholliers, et al, eds., *Dokumenten voor de geschiedenis van prijzen en lonen in Vlaanderen en Brabant/Documents pour l'histoire des prix et des salaires en Flandre et en Brabant*, 4 vols. (Bruges, 1959-65), Vols. I and II..

Table 8 **Master Craftsmen's Wages in Antwerp: Nominal and Real Wages in pence (d) groot of Brabant, in quinquennial means, 1401-05 to 1516-20 mean of 1451-75 = 100**

Year	Summer Wage Masons Masters d groot	Summer Wage Carpenters Masters d groot	Summer Wage Mean Masters d groot	Summer Wage Mason's labourers d groot	Summer Wage Mean Master Index 1451-75=100	Winter Wage: Craftsmen's Mean	Winter Wage percent summer
1401-05	7.750	7.675	7.713	4.000	64.271	6.000	77.85%
1406-10	8.000	8.000	8.000	4.000	66.667	6.000	75.00%
1411-15	8.000	8.000	8.000	4.000	66.667	6.000	75.00%
1416-20	8.000	8.000	8.000	4.000	66.667	6.000	75.00%
1421-25	8.000	8.000	8.000	4.000	66.667	6.000	75.00%
1426-30	8.000	8.000	8.000	4.000	66.667	6.000	75.00%
1431-35	9.700	9.600	9.650	6.100	80.417	7.100	73.75%
1436-40	10.000	10.000	10.000	6.400	83.333	8.200	82.00%
1441-45	11.400	11.800	11.600	6.800	96.667	9.150	79.05%
1446-50	12.000	12.000	12.000	7.000	100.000	9.250	77.08%
1451-55	12.000	12.000	12.000	7.000	100.000	9.250	77.08%
1456-60	12.000	12.000	12.000	7.000	100.000	9.250	77.08%
1461-65	12.000	12.000	12.000	7.000	100.000	9.250	77.08%
1466-70	12.000	12.000	12.000	7.000	100.000	9.100	75.83%
1471-75	12.000	12.000	12.000	7.000	100.000	9.000	75.00%
1476-80	12.000	12.000	12.000	7.000	100.000	9.000	75.00%
1481-85	12.000	12.000	12.000	7.000	100.000	9.000	75.00%
1486-90	12.900	12.900	12.900	7.600	107.500	9.900	76.67%
1491-95	12	12.000	12.000	7.400	100.000	9.000	75.00%
1496-00	12.400	12.000	12.200	7.850	101.667	9.000	73.78%
1501-05	12.500	12.000	12.250	7.700	102.083	9.000	73.47%
1506-10	12.500	12.000	12.250	8.000	102.083	9.000	73.47%
1511-15	14.000	12.900	13.450	8.200	112.083	9.600	71.46%
1516-20	15.000	15.000	15.000	8.500	125.000	10.500	70.00%

Table 8 **Master Craftsmen's Wages in Antwerp: Nominal and Real Wages in pence (d) groot of Brabant, in quinquennial means, 1401-05 to 1516-20 mean of 1451-75 = 100**

Year	Basket of Goods Total Value in d. gr. Brabant	Price Index 232.524d Brabant 1451-75=100	Basket of Goods Total Value in d. gr. Flemish	Price Index 155.016d Flemish 1451-75=100	Mean Master Wage Index 1451-75=100	Mean Master Real Wage Ind 1451-75=100	Master's Wage in Commodity Basket Units for 210 days earnings	Master's Wage in Commodity Basket Units for summer + winter wages (210 days)
1401-05	149.440	64.269	149.440	96.403	64.271	100.228	10.821	
1406-10	159.4	68.552	159.400	102.828	66.667	98.038	10.540	
1411-15	172.000	73.971	155.882	100.559	66.667	90.870	9.767	
1416-20	187.280	80.542	164.113	105.868	66.667	83.757	8.971	
1421-25	209.720	90.193	168.089	108.433	66.667	74.073	8.011	
1426-30	232.880	100.153	179.277	115.651	66.667	66.582	7.214	
1431-35	238.940	102.759	175.173	113.003	80.417	78.510	8.413	
1436-40	291.66	125.432	194.440	125.432	83.333	68.007	7.200	6.741
1441-45	245.260	105.477	163.507	105.477	96.667	92.447	9.885	9.118
1446-50	231.540	99.577	154.360	99.577	100.000	101.369	10.884	9.915
1451-55	229.140	98.545	152.760	98.545	100.000	101.821	10.998	10.235
1456-60	266.420	114.577	177.613	114.577	100.000	87.744	9.459	8.853
1461-65	211.760	91.070	141.173	91.070	100.000	110.151	11.900	10.919
1466-70	225.440	96.953	150.293	96.953	100.000	103.522	11.178	9.912
1471-75	229.860	98.854	153.240	98.854	100.000	101.312	10.963	10.586
1476-80	280.640	120.693	187.093	120.693	100.000	84.255	8.979	8.86
1481-85	362.160	155.752	241.440	155.752	100.000	67.498	6.958	6.657
1486-90	404.820	174.098	269.880	174.098	107.500	62.196	6.707	5.699
1491-95	309.760	133.216	206.507	133.216	100.000	79.179	8.135	6.956
1496-00	268.220	115.352	178.813	115.352	101.667	88.734	9.549	8.815
1501-05	291.7	125.449	194.467	125.449	102.083	81.552	8.819	8.212
1506-10	266.940	114.801	177.960	114.801	102.083	89.192	9.637	9.079
1511-15	320.660	137.904	213.773	137.904	112.083	81.298	8.781	8.204
1516-20	349.400	150.264	232.933	150.264	125.000	83.368	9.015	8.836

Sources: Herman Van der Wee, *The Growth of the Antwerp Market and the European Economy, 14th - 16th Centuries*, 3 vols. (The Hague, 1963), Vol. I: *Statistics*, pp. 333-89 (Synoptic Tables of Wages and Appendices 27-30); Herman Van der Wee, 'Prijzen en lonen als ontwikkelingsvariabelen: Een vergelijkend onderzoek tussen Engeland en de Zuidelijke Nederlanden, 1400-1700,' in *Album aangeboden aan Charles Verlinden ter gelegenheid van zijn dertig jaar professoraat* (Gent, 1975), pp. 413-47.

Table 9a. **Aggregate Mint Outputs of England and the Low Countries, 1290 - 1520**
Gold and Silver Coinage Outputs in kilograms of fine metal and in current pounds sterling (England) and groot (Flanders/Low Countries)

Years	ENGLAND Gold in kg.	ENGLAND Gold in £ ster.	ENGLAND Silver in kg.	ENGLAND Silver in £ st	ENGLAND Total in £ st	ENGLAND Percent Silver	ENGLAND Percent Gold
1281-85			21,913.309	68,548.734	68,548.734	100.00%	0.00%
1286-90			17,280.596	54,056.784	54,056.784	100.00%	0.00%
1291-95			1,552.352	4,856.034	4,856.034	100.00%	0.00%
1296-00			12,071.417	37,761.545	37,761.545	100.00%	0.00%
1301-05			16,017.465	50,105.484	50,105.484	100.00%	0.00%
1306-10			40,226.553	125,835.827	125,835.827	100.00%	0.00%
1311-15			10,706.712	33,492.502	33,492.502	100.00%	0.00%
1316-20			7,275.676	22,759.610	22,759.610	100.00%	0.00%
1321-25			1,780.107	5,568.492	5,568.492	100.00%	0.00%
1326-30			121.857	381.190	381.190	100.00%	0.00%
1331-35			209.056	665.131	665.131	100.00%	0.00%
1336-40			429.488	1,551.599	1,551.599	100.00%	0.00%
1341-45	240.011	9,859.484	5,077.456	17,710.473	27,569.958	64.24%	35.76%
1346-50	675.837	27,123.297	1,991.051	7,090.874	34,214.171	20.72%	79.28%
1351-55	1,939.777	83,567.731	17,442.905	67,245.275	150,813.007	44.59%	55.41%
1356-60	1,726.695	74,406.844	4,423.016	17,081.461	91,488.305	18.67%	81.33%
1361-65	2,415.242	104,077.756	1,630.811	6,298.107	110,375.864	5.71%	94.29%
1366-70	1,729.027	74,507.352	293.822	1,134.727	75,642.079	1.50%	98.50%
1371-75	802.608	34,586.019	316.966	1,224.108	35,810.127	3.42%	96.58%
1376-80	235.330	10,140.847	356.898	1,378.322	11,519.169	11.97%	88.03%
1381-85	161.835	6,973.804	317.412	1,225.829	8,199.633	14.95%	85.05%
1386-90	504.811	21,753.331	247.514	955.887	22,709.218	4.21%	95.79%
1391-95	626.546	26,999.152	193.489	747.245	27,746.397	2.69%	97.31%
1396-00	391.143	16,855.142	175.596	678.143	17,533.285	3.87%	96.13%
1401-05	168.671	7,268.390	66.344	256.216	7,524.606	3.41%	96.59%
1406-10	69.005	2,973.568	10.592	40.907	3,014.475	1.36%	98.64%
1411-15	1,870.669	89,519.896	967.484	4,483.340	94,003.236	4.77%	95.23%
1416-20	1,035.150	49,563.076	837.763	3,882.476	53,445.552	7.26%	92.74%
1421-25	2557.314	122,444.369	3,186.020	14,765.093	137,209.462	10.76%	89.24%
1426-30	599.478	28,703.069	6,858.608	31,785.107	60,488.176	52.55%	47.45%
1431-35	220.785	10,571.183	8,059.545	37,350.656	47,921.839	77.94%	22.06%
1436-40	132.274	6,333.298	977.025	4,527.863	10,861.161	41.69%	58.31%

Years	ENGLAND Gold in kg.	ENGLAND Gold in £ ster.	ENGLAND Silver in kg.	ENGLAND Silver in £ st	ENGLAND Total in £ st	ENGLAND Percent Silver	ENGLAND Percent Gold
1441-45	90.778	4,346.467	130.700	605.707	4,952.174	12.23%	87.77%
1446-50	64.336	3,080.422	517.373	2,397.681	5,478.103	43.77%	56.23%
1451-55	63.526	3,041.629	1,460.637	6,769.085	9,810.714	69.00%	31.00%
1456-60	26.719	1,279.288	1,415.094	6,558.024	7,837.312	83.68%	16.32%
1461-65	488.118	29,731.331	3,432.915	18,067.349	47,798.679	37.80%	62.20%
1466-70	1288.157	83,263.992	5,168.090	29,938.348	113,202.339	26.45%	73.55%
1471-75	538.669	34,818.552	2,422.654	14,034.247	48,852.799	28.73%	71.27%
1476-80	404.477	26,144.624	834.683	4,835.252	30,979.875	15.61%	84.39%
1481-85	219.449	14,184.753	995.231	5,765.296	19,950.049	28.90%	71.10%
1486-90	129.749	8,386.730	926.785	5,368.794	13,755.524	39.03%	60.97%
1491-95	268.983	17,386.525	1,270.840	7,361.876	24,748.402	29.75%	70.25%
1496-00	278.926	18,029.238	2,490.940	14,429.823	32,459.060	44.46%	55.54%
1501-05	516.604	33,392.271	4,313.544	24,988.026	58,380.297	42.80%	57.20%
1506-10	1523.115	98,451.267	3,633.212	21,046.916	119,498.183	17.61%	82.39%
1511-15	694.599	44,897.564	1,089.012	6,308.562	51,206.126	12.32%	87.68%
1516-20	743.656	48,068.530	79.145	458.481	48,527.011	0.94%	99.06%

Table 9. **Aggregate Mint Outputs of England and the Low Countries, 1290 - 1520**
Gold and Silver Coinage Outputs in kilograms of fine metal and in current pounds sterling (England) and groot (Flanders/Low Countries)

Years	LC Gold in kg.	LC Gold in £ groot	LC Silver in kg.	LC Silver in £ groot	LC Total in £ groot	LC Percent Silver	LC Percent Gold
1281-85							
1286-90							
1291-95							
1296-00							
1301-05							
1306-10							
1311-15							
1316-20							
1321-25							
1326-30							
1331-35							
1336-40	266.769	3,975.690	3,641.114	4,873.432	8,849.122	44.93%	55.07%
1341-45	1.322	26.600	176.761	310.860	337.460	7.88%	92.12%
1346-50	315.965	6,596.362	5,553.490	11,138.594	17,734.956	37.19%	62.81%
1351-55	1,096.661	24,811.554	5,178.951	11,397.252	36,208.806	68.52%	31.48%
1356-60	3,191.827	80,870.028	8,820.730	21,251.516	102,121.544	79.19%	20.81%
1361-65	2,629.891	77,350.494	3,992.165	11,141.966	88,492.460	87.41%	12.59%
1366-70	1,586.502	50,200.530	10,030.194	32,269.760	82,470.290	60.87%	39.13%
1371-75	1,375.349	32,921.278	2,215.757	8,315.146	41,236.424	79.84%	20.16%
1376-80	261.200	10,555.072	915.615	3,648.742	14,203.814	74.31%	25.69%
1381-85	529.809	22,941.630	2,816.883	11,467.496	34,409.126	66.67%	33.33%
1386-90	423.106	20,865.908	1,787.714	7,792.290	28,658.198	72.81%	27.19%
1391-95	368.614	14,458.242	3,676.062	14,958.400	29,416.642	49.15%	50.85%
1396-00	324.589	12,731.424	5,791.306	23,507.520	36,238.944	35.13%	64.87%
1401-05	31.535	1,236.902	691.661	2,826.540	4,063.442	30.44%	69.56%
1406-10	19.025	636.250	1,113.700	3,887.994	4,524.244	14.06%	85.94%
1411-15	5.884	196.762	2,484.269	8,665.846	8,862.608	2.22%	97.78%
1416-20	4.308	181.634	3,124.468	15,052.698	15,234.332	1.19%	98.81%
	37.626	2,000.940	11,897.359	57,614.792	59,810.488	3.67%	96.33%
1421-25							

Table 9. **Aggregate Mint Outputs of England and the Low Countries, 1290 - 1520**
Gold and Silver Coinage Outputs in kilograms of fine metal and in current pounds sterling (England) and groot (Flanders/Low Countries)

Years	LC Gold in kg.	LC Gold in £ groot	LC Silver in kg.	LC Silver in £ groot	LC Total in £ groot	LC Percent Silver	LC Percent Gold
1426-30	533.508	32,798.618	7,999.913	43,326.036	112,796.344	61.59%	38.41%
1431-35	713.610	42,313.694	6,609.816	34,252.100	149,615.344	77.11%	22.89%
1436-40	462.681	25,789.038	5,015.219	25,788.306	54,322.696	52.53%	47.47%
1441-45	111.931	6,466.290	102.683	527.552	6,993.842	92.46%	7.54%
1446-50	2.550	148.084	5.911	40.786	188.870	78.41%	21.59%
1451-55	581.075	35,611.968	164.611	880.316	51,582.008	98.29%	1.71%
1456-60	226.060	13,854.358	64.066	408.310	15,922.228	97.44%	2.56%
1461-65	6.596	404.224	0.000	0.000	404.224	100.00%	0.00%
1466-70	243.168	15,738.918	4,628.964	27,867.694	44,268.420	37.05%	62.95%
1471-75	261.202	18,927.514	7,313.984	45,191.724	64,119.238	29.52%	70.48%
1476-80	264.130	16,937.013	2,435.507	14,877.766	35,296.998	57.85%	42.15%
1481-85	52.818	4,735.692	6,534.304	56,337.178	61,553.570	8.47%	91.53%
1486-90	112.938	20,319.780	6,803.602	78,323.898	102,460.862	23.56%	76.44%
1491-95	19.308	1,273.661	2,780.071	19,521.098	20,857.438	6.41%	93.59%
1496-00	474.633	44,464.280	5,209.254	43,603.013	88,067.293	50.49%	49.51%
1501-05	538.871	51,112.530	3,157.836	26,902.913	78,015.442	65.52%	34.48%
1506-10	311.480	29,575.609	1,383.730	11,892.196	41,467.805	71.32%	28.68%
1511-15	257.699	24,459.800	1,640.383	14,074.127	38,533.927	63.48%	36.52%
1516-20	145.094	13,779.872	705.122	6,152.620	19,932.492	69.13%	30.87%

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